

مشاركة



محاضرة (١) و (٢)

Introduction

FAO: Food Agriculture Organization.

WHO: World Health Organization.

OIE: Office International of Epizootics.

APHA: American Public Health Organization.

CDC: Centers for disease control & prevention.

WHO define zoonosis as:

- Disease or infections that naturally transmitted between animal & man & vice versa leading to serious illness.

Or:

- All diseases transmitted under natural & un-natural conditions from lower vertebrates A' causing illness or morbid changes to human.

MLB

$$\bullet \text{ Incidence} = \frac{\text{No.of new cases}}{\text{total no.of population}} \times 100$$

$$\bullet \text{ Prevalence} = \frac{\text{No.of new cases} + \text{No.of old cases}}{\text{total no.of population}} \times 100$$

CLASSIFICATION OF ZOONOTIC DISEASES:

1. According to their reservoir host:

Items	<i>Anthropozoonoses</i>	<i>Zooanthroponoses</i>	<i>Amphixinoses</i>
Def.	<ul style="list-style-type: none">✓ <u>Anthro</u> = human.✓ <u>Zoo</u> = Animal.✓ <u>Oses</u> = disease.✓ Dis. transmitted from lower vertebrates to man.	<ul style="list-style-type: none">✓ <u>Anthro</u> = human.✓ <u>Zoo</u> = Animal.✓ <u>Oses</u> = disease.✓ Dis. transmitted From man to lower vertebrates	<ul style="list-style-type: none">✓ Dis. transmitted in <u>both</u> man & lower vertebrates
Ex:	<ul style="list-style-type: none">• Brucellosis• Glanders• Rabies• Anthrax	<ul style="list-style-type: none">• Human T.B• Diphtheria• Staphylococcus intoxication• Septic sore throat.• Scarlet fever.	<ul style="list-style-type: none">• T.B• Aspergillosis (deep mycosis)• Influenza.

Revoir host: *natural habitat host in which M.O can live, multiply, metabolize & replicate till reach susceptible host.*

2. According to life cycle of infecting organism:

Items	1. Direct Zoonoses	2. Cyclo-Zoonoses	3. Meta-Zoonoses
Def.	✓ Dis. transmitted from infected vertebrate host to susceptible host. <u>By</u> : 1) Direct contact. 2) Indirect contact. 3) Vehicle. 4) Mechanical vector.	✓ Dis. requires more than one vertebrate host species to complete their life cycle as: cestodes.	✓ Dis. Transmitted <u>biologically</u> by in vertebrates vectors (arthropods).
characters	Transmitted by: a. physical contact <ul style="list-style-type: none"> • Animal → rabies • Tissue → anthrax • Excretion → leptospirosis • Air-borne → T.B & influenza • Other generalized aerosol → brucellosis. b. vehicle born through ingestion of <ul style="list-style-type: none"> • Milk → salmonellosis • Meat → trichinosis • Water → lamblasi. 	Types a. obligatory <ul style="list-style-type: none"> ✓ man must be one of vertebrate host as: <ul style="list-style-type: none"> ○ T. saginate → cattle. ○ T. solium → pig. b. non-obligatory <ul style="list-style-type: none"> ✓ As in transmission of <u>Hydatid disease</u> in which <u>man</u> may be involved. 	in which causative agents are: 1) Multiple: <ul style="list-style-type: none"> ✓ Propagative or cyclo-propagative transmission. 2) Develops: <ul style="list-style-type: none"> ✓ developmental transmission 3) Both: <ul style="list-style-type: none"> ✓ there is an extrinsic incubation period in vertebrates host before transmission to another vertebrates host As: <ul style="list-style-type: none"> • human plague • trypanosome • leishmaniasis • Yellow fever.

Items	4. Sapro-zoonoses	5. Cyclo-meta-Zoonoses	6. Sapro-metazoonoses
Def.	✓ Dis. have both vertebrate & non-animal (<u>fomite</u>) developmental site to serve either as true reservoir <u>or</u> site for development as organic matter, soil, Plant & food. Ex <ul style="list-style-type: none"> ✓ Mycosis ✓ Tetanus 	✓ Infectious reagent require both vertebrate and invertebrate host to complete its development. Ex: <ul style="list-style-type: none"> ✓ Heterophyiasis <ul style="list-style-type: none"> ✓ 1st host is snail ✓ 2nd host is brackish water fish 	✓ M.O undergoes certain stage of development in both invertebrate & environment before it able to be infective. Ex: <ul style="list-style-type: none"> ✓ Fascioliasis need invertebrate host as snail to form cercaria & inanimate object (fomite) as: vegetable to form encysted metacercaria.

Items	7. Geo-zoonoses	8. Ichthyo-zoonoses	9. Xeno-zoonoses
Def.	✓ The developmental stage of infectious agent occurs in soil only before it able to induce infection. EX: ✓ Toxoplasmosis. ✓ Hook worm.	✓ <u>Disease transmitted from fish to man.</u> EX: ✓ Hetrophyes Hetrophyes ✓ Diphylopithriasis.	✓ Disease transmitted by xeno- transplantation (organ/tissue). ✓ From A' to human. ✓ Of little importance. EX: ✓ Xebor cantilage .

3. according to infectious agent

1. bacterial agent (bacteriosis)	→ T.B , anthrax & Brucella.
2. Chlamydial agent (chalmydiosis)	→ ornithosis.
3. Rickettsial agent (rickettsiosis)	→ Q-fever.
4. Viral agent (virosis)	→ rabies , FMD , ND
5. Mycotic agent (mycoses)	→ ring worm.
6. Parasitic agent (parasitoses)	→ Fascioliasis & amoebiasis.

N.B

Zomite

- ✓ Inanimate object not supporting bacterial growth but transmit pathogenic microorganisms from sick (susceptible host)

Ex:

- ✓ Hetrophyes Hetrophyes eggs don't hatch but snail take it cercaria encysted metacercaria in B.W fish man eat fish.

Hydatid disease

- ✓ Infection of intermediate host by larval stage caused by immune reaction (Ag x Ab reaction).

Items	Listeriosis	Glanders	Melioidosis
synonyms	<ul style="list-style-type: none"> ✓ <u>In man:</u> Listeriosis - listeriasis - leukocytosis - mononucleosis. ✓ <u>In animal:</u> circling disease (cattle) - encephalitis (sheep) - meningio-encephalitis (ruminants). 	<ul style="list-style-type: none"> ✓ <u>In man:</u> Burkholderia mallei & Pseudomonas mallei. ✓ <u>In animal:</u> farcy, Malleus, malliasmus, Droes, nasal phthisis. 	<ul style="list-style-type: none"> ✓ <u>In man:</u> Rodent Glanders disease & Whitomer's disease. ✓ <u>In animal:</u> Burkholderia pseudo mallei & Pseudomonas pseudo mallei.
Def.	✓ Bacterial dis. making <u>specific abortion</u> in woman & sheep.	✓ Bacterial dis. Affect human, equines & family of solipeds.	✓ Bacterial dis. Affect workers & many A' spp. (horse, cattle, sheep, goat & cat).
Host	✓ Effect wide range of hosts <u>includes:</u> pregnant woman - old aged A' - immune suppressive A'.	<ul style="list-style-type: none"> ✓ Human acquired from infected Horse. ✓ Occupational dis (solders + coachmen + Butchers). 	<ul style="list-style-type: none"> ✓ No cases recorded in human affected from A' yet. ✓ Horse, cattle, sheep, goat & cat. ✓ Sheep - goat - swine (most susceptible).
Causative Agent	<ul style="list-style-type: none"> ✓ <u>Listeria monocytogenes.</u> * L. innocua. * L. welchimeri. * L. Seeligeri * L. ivanovii. * L. greyi. 	<ul style="list-style-type: none"> ✓ Burkholderia mallei. ✓ Pseudomonas mallei. 	<ul style="list-style-type: none"> ✓ Burkholderia pseudo mallei ✓ Pseudomonas pseudo mallei.
Reservoir Host	sheep - cattle - goat - buffalo - horse - swine - deer - dog - cat - lab A' - fur cheering A' - poultry	<ul style="list-style-type: none"> ✓ Horse (solipeds) ✓ Tiger & lion (wild A'). 	<ul style="list-style-type: none"> ✓ Surface water & soil (rice fields). ✓ Workers in rice fields.
Source of infection	<ol style="list-style-type: none"> 1. Aborted feti & Placenta & amniotic fluid. 2. Raw milk & egg & their by-products. 3. Meat during septicemia. 4. Contaminated soil & vegetables with manure. 5. Fresh & sewage water. 	<ul style="list-style-type: none"> ✓ Exudate of skin lesion of man <u>or</u> A'. <p>Dog & cat & camel may be affected.</p>	<ol style="list-style-type: none"> 1. Water (stagnant), soil (rice fields) → contaminated with abscesses discharge. 2. Contaminated dust.
Mode of transmission	<ol style="list-style-type: none"> 1. <u>Direct contact</u> with aborted feti & placenta. 2. <u>Drinking</u> contaminated water & milk 3. <u>Ingestion</u> of contaminated food (soft cheese) & contaminated fish. 4. <u>Inhalation</u> of contaminated dust. 5. <u>Prenatal transmission</u> → offspring infected via bl. Stream <u>or</u> placenta. 6. <u>Man-to-man transmission.</u> 7. <u>Sexual contact.</u> 	<ol style="list-style-type: none"> 1) Contact with nasal discharge → abrasions in skin & M.M. 2) Intact mucus M.M → contact with abscesses & nasal discharges. 3) Inhalation infected droplet & dust. 4) Ingestion (hand to mouth). 5) Lab workers during rough handling of culture - cages & experimental A'. 	<ol style="list-style-type: none"> 1. Contact with contaminated soil & water → especially with skin abrasions & wounds 2. Inhalation contaminated dust. 3. Ingestion of contaminated water. 4. Rat flea (<u>Xenopsylla cheopis</u>) & Mosquitoes (<u>Aede aegypti</u>). 5. <u>Man-to-Man transmission</u> by sexual contact (urogenital Melioidosis).
M.O	<ul style="list-style-type: none"> ✓ G +ve, non-capsulated, non-sporulated. ✓ Escape from phagosome → Sterolysin → Intra-cytoplasmic multiplication. 	<ul style="list-style-type: none"> ✓ G -ve, non-motile, non-capsulated. ✓ Grow in potato media. 	<ul style="list-style-type: none"> ✓ G-ve, Motile, non-capsulated, non-sporulated.

M.O	<ul style="list-style-type: none"> ✓ G +ve → culture → after 48 hrs. → G-ve. ✓ Optimum temp. = 37 - 38 °c. ✓ Range = up to 45 °c. <p>3 factors aid in its transmission:</p> <ol style="list-style-type: none"> 1. Resist salting (NaCL). 2. Multiplication in refrigeration. 3. Survive in pasteurization if bacteria more than 1000 bacteria/ml. 	<ul style="list-style-type: none"> ✓ Sensitive to direct sun light & dryness. 	<ul style="list-style-type: none"> ✓ Survive for 50 years in lab. ✓ Dormonant for several years.
Geographical map	<ul style="list-style-type: none"> ✓ ↑ in temperate & cold climate. ✓ Sporadic cases & may be epidemic. ✓ 40 % of cases appear in 1st 3 weeks of live ✓ Affect all ages & its effect appear during pregnancy. 	<ul style="list-style-type: none"> ✓ Previously worldwide distribution. دولتي في اثيوبيا – السنغال – السودان – افغانستان – ايران ✓ <u>Mongolia.</u> 	<ul style="list-style-type: none"> ✓ South, east & Asia ✓ Endemic dis. In Australia.
Clinical Signs	<ol style="list-style-type: none"> 1. repeated abortion in woman at 2nd half of pregnancy 2. Flue like symptoms. 3. Affect C.N.S → meningitis & meningio-encephalitis with monocytosis. 4. Skin affections → popular eanthena on arms & hands (cutaneous eruption). 5. Occupational disease. 6. Death in age less than 1 year & over 65 y 	<ol style="list-style-type: none"> 1. Fever - headache & prostration. 2. Physical signs → painful nodules wide & large in size. 3. Abscesses in resp. tract or skin (Farcy). 4. Star shaped ulcer in nasal septum with (mucoid discharge → mucopurulent → tinged with blood. 5. Enlargement of Ln. 6. Metastatic abscesses → pyemia → Death. 	<ol style="list-style-type: none"> 1. <u>Acute form</u>: → sudden Death. 2. <u>Sub-acute form</u>: → respiratory illness (mild bronchitis to severe fatal pneumonia). 3. <u>Fever of unknown origin.</u> 4. <u>Septicemic cases</u>: → abscesses, pyemia, osteomyelitis. 5. <u>Chronic form</u>: necrosis & granuloma with caseation in lung, bone, L.N. . 6. pyelonephritis, cystitis, prostatitis & encephalitis
Prevention & Control	<ol style="list-style-type: none"> 1. Isolation of infected A'. 2. Hygienic disposal of aborted feti & A' carcass. 3. Heat treatment of suspected meat & milk. 4. Pasteurization of milk. 5. Hygienic measures (suit + gloves + disinfection) 6. Caution to people who contact with infected A'. 7. Health education. 8. Rodent control & destruction of infected birds. 9. Carefully examine pregnant woman. 	<ol style="list-style-type: none"> 1) Rapid detection & isolation of infected A'. 2) Notification & quarantine measures. 3) Routine mallein testing. 4) Lab workers → Carful handling. 5) High care & Hygienic measures with horses have nasal discharge & ulcers. 6) Careful with feeding & handling human patients. 	<ol style="list-style-type: none"> 1. Avoid contact with contaminated soil & water. 2. Wearing long rubber boots in rice fields. 3. Suppression of dust & Plantation of tress. 4. Derattization. 5. Dryness of unnecessary canals. 6. Rodent & mosquitoes control. 7. Prevent susceptible persons to move to endemic area.
Treatment	<ul style="list-style-type: none"> ✓ Ampicillin (best ttt). ✓ Chlortetracycline (↓ bone). ✓ Streptomycin, erythromycin ✓ Sulphamethaxole & trimethoprim combination. 	<ul style="list-style-type: none"> ✓ <u>Less severe</u>: Sulphadiazine 100 mg/kg. ✓ Sulphonamide, streptomycin ... ✓ <u>More sever</u>: Doxycycline, cefazidime 6 gm/day. 	<ul style="list-style-type: none"> ✓ <u>Less severe cases</u> → antimicrobial drugs. ✓ Sulphamethaxole & trimethoprim combination. ✓ <u>Severe cases</u>: Cefazidime 6gm/day I.V.

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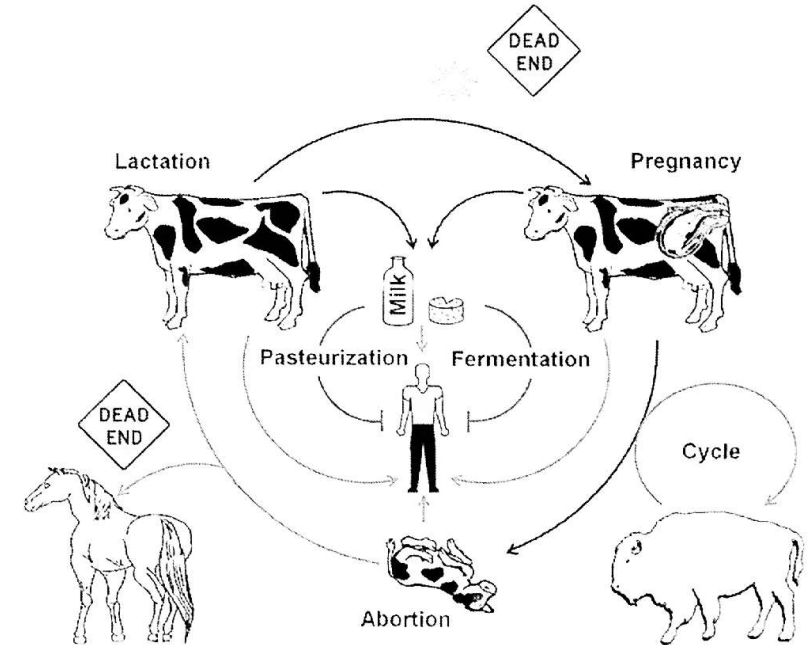
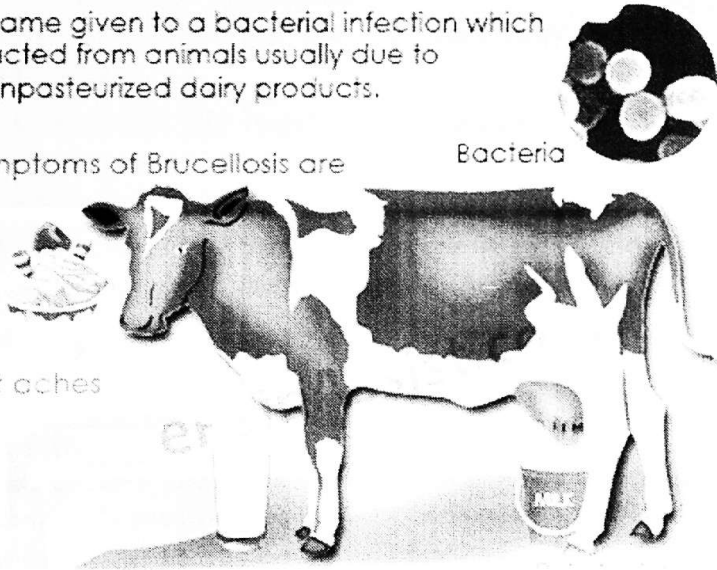
محاضرة (٣)

Brucellosis in Humans

Brucellosis is the name given to a bacterial infection which basically is contracted from animals usually due to consumption of unpasteurized dairy products.

Some of the Symptoms of Brucellosis are

- Fevers
- Chills
- Weakness
- Lethargy
- Muscle and joint aches and pains
- Headaches.



د. ميادة

Items	Brucellosis	Tularemia
synonyms	<ul style="list-style-type: none"> ✓ <u>In man</u>: undulant fever = Malta fever = Mediterranean fever = Gibraltar fever. ✓ <u>In animal</u>: contagious abortion - infectious abortion - Epizootic abortion & Abortus fever. ✓ <u>Bang's dis.</u> → In cattle. ✓ <u>Ram epididymitis</u> → In sheep. 	<ul style="list-style-type: none"> ✓ Rabbit fever ✓ Deer fly fever ✓ Hara's disease ✓ Francis's disease
Def.	<ul style="list-style-type: none"> ✓ Chronic granulomatous systemic Bacterial dis. making <u>storm of abortion, retained placenta & sever economic losses</u> in dairy farms. ✓ Under certain circumstances can be transmitted to <u>man</u>. 	<ul style="list-style-type: none"> ✓ Rarely zoonotic highly infectious disease caused by <u>Francisella tularensis</u>.
Host	<ul style="list-style-type: none"> ✓ Many spp. Of Brucella affect wide range of hosts. ✓ Cross reactions between Brucella spp. May occur. 	<ul style="list-style-type: none"> ✓ Human acquired from infected Horse. ✓ Occupational dis (solders + coachmen + Butchers).
Causative Agent	<ol style="list-style-type: none"> 1) B. melitensis → sheep & goat → (5 serotypes) 2) B. Suis → pig → (3 serotypes) 3) B. Abortus → cattle & buffalo → (7 serotypes) 4) B. Canis → Dog <div style="text-align: center;"> <p>↓</p> <p>Acc.to Virulence To man</p> </div>	<ul style="list-style-type: none"> ✓ Francisella tularensis. ✓ Pasteurella tularensis.
M.O	<ul style="list-style-type: none"> ✓ G -ve, coccobacilli, <u>No flagella</u> & <u>No capsule</u>. ✓ Grown in CO2 incubator 10 % CO2 ✓ Highly pathogenic (bio-terroristic). ✓ <u>Smooth</u> due to lipopolysaccharide play a role in antigenicity. ✓ <u>Rough</u> due to <u>absence</u> of lipopolysaccharide (attenuated). 	<ul style="list-style-type: none"> ✓ Francisella tularensis <ul style="list-style-type: none"> ○ Genotype A ○ Genotype B (more virulent). ✓ G -ve, non-motile, non-spore forming, thin capsule, <u>bipolar stain</u>. ✓ Growth in presence of blood or serum with addition of <u>0.1 % cysteine</u>.
Reservoir Host	<p>Sheep - goat - pig - cattle - buffalo - camel - horse (<u>fistulas wither</u>) - fowl - deer - dog & cat - rodents.</p>	<ul style="list-style-type: none"> • Wild Rabbits, small animals as: rats, mice, squirrels. • <u>Accidental hosts</u> as: sheep & cat. • <u>Ticks</u>: primary vectors & biologically transmitted.
Source of infection	<ol style="list-style-type: none"> 1. Aborted feti. 2. Secretions & excretions of infected A' & Raw milk & milk by products. 3. Direct contact by penetration of intact & abraded skin. 4. Preparation & inj. of Vaccine may cause infection in vets. 5. Uncooked meat especially: <u>liver - spleen - L.N.</u> 6. Vegetables contaminated with secretions of infected A'. 	<ol style="list-style-type: none"> 1. Water, 2. mud, 3. Decayed matters. 4. Carcasses, 5. Ticks & flies.

Mode of transmission	<p>1. In animals:</p> <p>a. Mainly by A.I (artificial insemination).</p> <p>b. Horizontal transmission:</p> <ul style="list-style-type: none"> ✓ Inhalation (dust borne & droplet infection). ✓ Contaminated food & water. <p>b. Vertical transmission:</p> <ul style="list-style-type: none"> ✓ Mother to fetus → intra uterine <u>or</u> through Colostrum. <p>2. In human:</p> <p>a. Man-to-Man transmission (mother to infants through breast feeding, sexually <u>or</u> blood transfusion).</p> <p>b. Ingestion of unpasteurized & raw milk.</p> <p>c. Direct contact with infected A' through intact M.M & skin.</p> <p>d. Handling infected materials in lab & T.C.</p> <p>e. Accidental inoculation during vaccination.</p>	<ol style="list-style-type: none"> 1. Biting by ticks & flies. 2. Ingestion of contaminated rabbit, water. 3. Inhalation of manure water & animal wastes. 4. Skin by contaminated object in lab. 5. Occupational disease → (house wife) during skinning of rabbit. 6. Man-to-Man transmission not recorded.
Clinical Signs	<p>In animals:</p> <ul style="list-style-type: none"> ✓ Storm of abortion in last trimester of pregnancy, infertility endometritis, salpingitis, seminal vasculitis & arthritis & still birth & retained placenta decreased milk yield. ✓ Excreted through all body secretions (milk - semen - urine - unpasteurized milk & milk products) uncooked meat especially liver, spleen, uterine fluid, placenta, placentome & aborted fetus. <p>In human: (I.P = 15 days)</p> <ul style="list-style-type: none"> • Flu-like symptoms. • Fever, sweating especially at night with fetid odor of sweat - Sudden onset, in-appetence, rarely abortion, Orchitis & decrease fertility-paravertebral & intra vertebral disc - impotence. • Malaise - anorexia - myalgia - arthritis - hepato-splenomegaly. 	<p>1. Ulcero-glandular form:</p> <ul style="list-style-type: none"> ✓ Most common 85% ✓ Present on skin of hand & finger ✓ Skin lesions from long feces ✓ Enlarged lymph node & ulcer. <p>2. Oculo-glandular form:</p> <ul style="list-style-type: none"> ✓ Granulomatous conjunctivitis + regional adenopathy. <p>3. Glandular form:</p> <ul style="list-style-type: none"> ✓ Regional lymphadenitis <u>without</u> ulceration in inoculation site. <p>4. Oro-pharyngeal form:</p> <ul style="list-style-type: none"> ✓ Oro-pharyngitis & tonsillitis. <p>5. Pleuro-pulmonary form:</p> <ul style="list-style-type: none"> ✓ Respiratory signs by <u>Francisella tularensis</u>. <p>6. Septicemic form:</p> <ul style="list-style-type: none"> ✓ Vomition, abdominal pain, convulsion

Diagnosis

1. Case history & screening test.
2. Sampling from **SERUM**, liver, spleen, placenta, uterine fluid, aborted fetus.
3. Field test: milk ring test (not diagnostic).
4. Serological tests: Rose Bengal test, CFT, ELISA, BAPA & agglutination test, PCR & real type PCR.
5. Ig G & Ig M:

Ig M.	Ig G
✓ High molecular weight.	✓ Late in infection
✓ Early in infection.	✓ Complement dependent
✓ <u>Not</u> complement dependent.	✓ <u>Ig G1 is used for diagnosis.</u>
✓ <u>Responsible for cross reaction.</u>	

في العملي بالتفصيل

Prevention & Control

Preventive vet. Measures:

- ✓ Human education, Protective clothes & gloves, long sleeves.
- ✓ Construct healthy Brucella free dairy farms.
- ✓ Quarantine for newly purchased A' at least 30 days (Test twice).
- ✓ Examine abortion - Periodical testing - Hygienic measures.

A. Animal:

- ✓ Periodic testing of animals by 3 tests: 3 successive negative results indicate No brucellosis.
- ✓ Infected animals must be isolated & slaughtered with disinfection of the area.

B. Vaccination:

1. Stain 19 & Rev I vaccine (smooth form of LPS of M.O).

- ✓ Increase AB titer.
- ✓ Induced infection in human.
- ✓ Taken 3-6 months of age.
- ✓ Antigenic similar with stain 19.
- ✓ Not produced in Egypt → need biosafety level III.

2. RB51:

- ✓ Better than strain 19 due to No errors in serology.
- ✓ No lipopolysaccharides (No virulence).
- ✓ Not taken by pregnant animal above 3 months of pregnancy even intra conjunctival Inj. Of sub dose may cause infection.

- ✓ Good hygienic measures.
- ✓ Education of disease.
- ✓ Wearing protective clothes.
- ✓ Cooking food well.
- ✓ Disinfection of water.
- ✓ Eradication of rodents.

3. 45/20:

- ✓ Strain 45 of Brucella with serial dilution 20 times.

Advantages	Disadvantages
<ul style="list-style-type: none">• Killed vaccine safe for human.• Used to vaccinate cow at any age.	<ul style="list-style-type: none">• Since a single dose given a little protection.• Two doses 6-12 weeks apart are required.• It can't be used at young age• Immunity not last• Repeated after 18 months

Notes

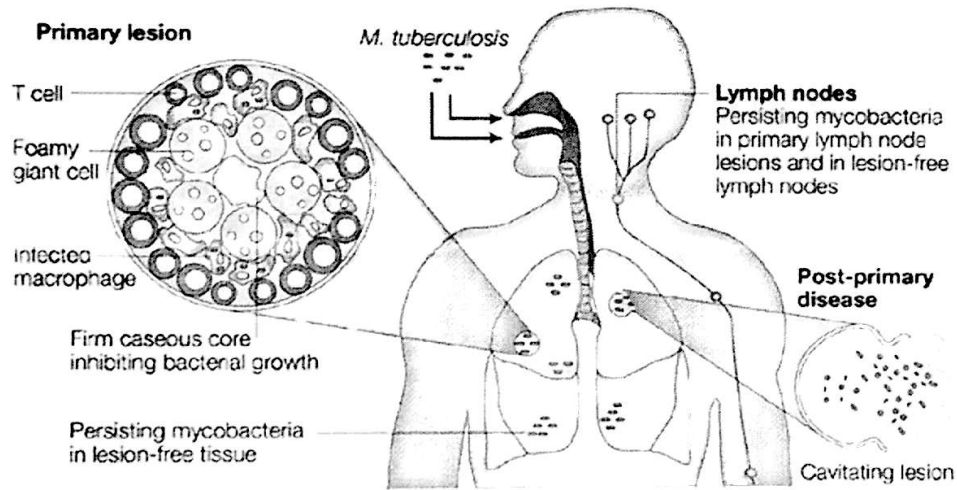
BRUCELLA:

- Could be isolated from infected A' for 1 month.
- Intracellular M.O still alive inside phagocytic & non phagocytic cells (RES = liver, spleen & L.N).
- Not activate immune response.
- Erythritol which present in uterus attract it.
- Cause abortion as it cause placentitis, death of fetus & hormonal disturbance.
- Love: trophoblast, fetal lung, uterus & L.Ns.
- Not present in Meat → because rigor mortis → produce lactic acid → that change PH → kill it.
- Destroyed by direct sun light.
- Live in mud & contaminated water.
- Can live in refrigerated milk for → 88 days & in milk products for → 100 - 150 days.
- Pasteurization & NaOH 10% → kill it.

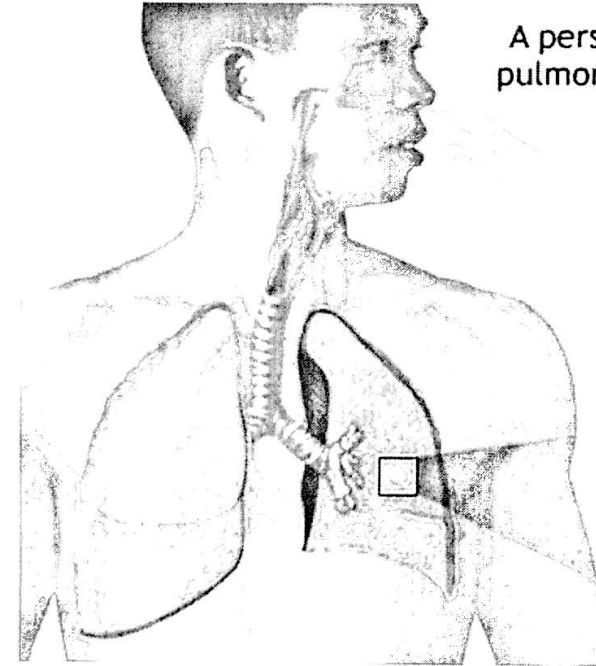
- Name of Francisella tularensis has been given to the infective agent in honor of Dr. Edward Francis who named the dis. After Tulare country in California where it was discovered & traced to wild rabbits.

مشتركة

محاضرة (E)

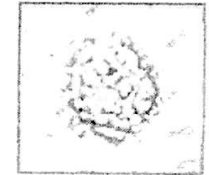


Nature Reviews | Microbiology



A person may contract pulmonary tuberculosis from inhaling droplets from a cough or sneeze by an infected person

Granuloma in lung tissue



د. حازم

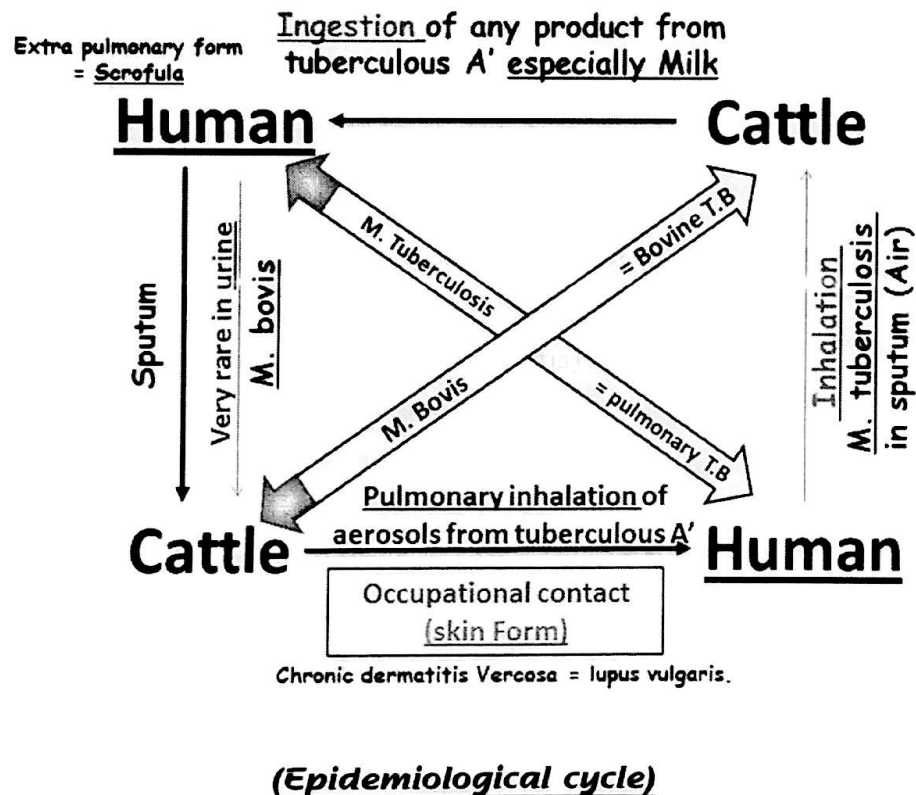
Items	Tuberculosis	Tetanus
synonyms	<ul style="list-style-type: none"> ✓ <u>In human:</u> human tuberculosis. ✓ <u>In animal:</u> bovine tuberculosis. 	<ul style="list-style-type: none"> ✓ <u>In human:</u> tetanus. ✓ <u>In animals:</u> Lock jaw <u>or</u> trismus.
Def.	<ul style="list-style-type: none"> ✓ Disease of worldwide occurrence <u>that causes</u> great harm to <u>dairy farms</u> as well as <u>risks of public health importance.</u> 	<ul style="list-style-type: none"> ✓ <u>Non-contagious & non-febrile infectious zoonotic dis. Of man & A'.</u> ✓ <u>Sapro-zoonotic dis.</u>
Host & susceptibility	<ul style="list-style-type: none"> ✓ Human. ✓ Cattle - sheep - goat - birds. 	<u>Human & all diseased A' (horse - mules - donkeys - sheep & goats).</u> <ul style="list-style-type: none"> ✓ Residents of rural area > those of cities. ✓ More frequent in men than women. ✓ More common in new born & children than adults.
Causative Agent	<ol style="list-style-type: none"> 1) M. tuberculosis (reservoir host is <u>human</u>) 2) Animals can be infected as <u>a reverse zoonosis.</u> 3) (M. bovis) in <u>bovine</u>, (M. ovis) in <u>sheep</u>, (M. avium) in <u>birds</u>. 	<ul style="list-style-type: none"> ✓ Endotoxin (tetanospasmin & Tetanolysin) of Clostridium tetani.
M.O	<u>Mycobacterium tuberculosis - bovis - ovis & avium.</u> <ul style="list-style-type: none"> ✓ G -ve, Small, aerobic, Non-motile, Non-capsulated, Non-sporulated, acid alcohol fast bacilli. ✓ Divide every 16-20 hrs growth on <u>Lowenstein Jensen media</u> (Slow growing). 	<ul style="list-style-type: none"> ✓ G +ve, rod shaped, sporulated in unfavorable environment & found in soil rich in humus & feces of human & A'. <u>C. Tetani:</u> <ul style="list-style-type: none"> ✓ Spores → circular & terminal → drum stick spores. <u>C. Botulinum</u> <ul style="list-style-type: none"> ✓ Spores → oval & sub terminal.
Reservoir Host	<ul style="list-style-type: none"> ✓ All tuberculous animals (Cattle, sheep, goat). 	<ul style="list-style-type: none"> ✓ All diseased A' (Horse - mules - donkeys - sheep & goat).
Source of infection	<ol style="list-style-type: none"> 1. Ingestion of <u>milk</u> infected with (M. bovis) <u>localized</u> in GIT, Lymph nodes of digestive system. 2. Pre-pasteurization Milk. 3. Inhalation droplet, dust infection cause. 	<ol style="list-style-type: none"> 1) Soil containing agent <u>or</u> contaminated with spores. 2) Commonly horse feces. 3) Dirty instruments.

Incidence

Classic pulmonary T.B:

- ❖ Similar to M. tuberculosis infection sheds M.Os back to other animals through air way. (Mainly bovine-to-bovine infection).
- ❖ Rare man-to-man transmission of M. bovis.
- ✓ Skin it's a route for who deals with neglected infected carcass
- ✓ It's an occupational disease (direct & reverse zoonosis)
- ✓ Incidence of pulmonary T.B caused by M. bovis is high in farms & slaughter house workers than in urban habitat.

REVERSE ZOONOSES



Mode of action of endotoxin:

- ✓ Its Neurotoxin → bind to inhibitory inter-neurons of spinal cord → block release of inhibitors (that allow contract Muscles to be relaxed) → so, it keep continuous release of acetyl choline → which keeping the involved muscles in a state of contractions → spastic paralysis.

Mode of transmission	<p>6. Transmission of <i>M. bovis</i> to human via meat - milk & it's by products → <u>eliminated by pasteurization of milk.</u></p> <p>7. <u>Inhalation</u> (droplet infection & dust borne infection).</p> <p>8. Through <u>skin</u> (butchers & meat inspectors).</p>	<p>1. Man & Animals → ingestion → intestine → feces → soil.</p> <p>2. Lacerated wounds.</p> <p>3. Imperfect sterilization of surgical instruments.</p> <p>4. Contaminated cat gut.</p> <p>5. Neonatal infection (<u>tetanus neonatorum</u>) → infection of umbilical cord stump after parturition.</p>
Clinical Signs	<p>7. <u>Pulmonary form: (Wasting dis. = White plague):</u></p> <ul style="list-style-type: none"> ✓ Affection of lung & associated L.Ns. ✓ Productive cough. ✓ Night sweats in advanced cases (<u>not</u> profuse <u>or</u> offensive). ✓ Chest pain, Cachexia. ✓ Hemoptysis. ✓ Low grades of fever. ✓ Easily fatigability. ✓ (<u>Need several weeks to years</u>). <p>8. <u>Extra pulmonary form:</u></p> <ul style="list-style-type: none"> ✓ <u>Tuberculosis in any parts of body other than lung.</u> ✓ <u>Scrofula</u> → (cervical lymphadenitis). ✓ <u>Bone</u> → (tuberculous osteomyelitis). ✓ <u>Liver</u> → (tuberculous hepatitis). ✓ <u>Intestine</u> → (localized tuberculous lesions). ✓ <u>Uterus</u> → (tuberculous metritis). ✓ <u>Kidney</u> → (tuberculous nephritis) → <u>urine</u> → <u>rare infection.</u> <p>9. <u>Lupus vulgaris (skin form):</u></p> <ul style="list-style-type: none"> ✓ <u>Ulcerative lesions</u> at the point of bacilli entry associated <u>with yellowish brown nodule</u> with <u>regional lymphadenitis.</u> 	<p>1. Painful <u>tonic & clonic spasm</u> of:</p> <ul style="list-style-type: none"> ○ <u>masseter muscles (trismus),</u> ○ <u>masticatory muscles (lock jaw),</u> ○ <u>Neck muscles (ascending tetanus).</u> <p>2. Within few hrs spasm spread to spine, chest, abdomen (descending).</p> <p>3. Spasm of facial Muscles (snarling grin = sardonic smile = opisthotonus convulsions).</p> <p>4. Rigidity of abdominal muscles, urine retention & constipation.</p> <p>5. Reflux convulsion by external stimuli (loud noise).</p> <p>6. High fatality rate with short incubation period & long duration of convulsions.</p>

Pre-disposing factors	<u>6.</u> Debilitating diseases as: AIDS. <u>7.</u> Prolonged Malnutrition & diabetic patients. <u>8.</u> 1-5 years children → always drink milk → (due to its availability). <u>9.</u> Pregnant are more susceptible than non-pregnant. <u>10.</u> <u>Males</u> more susceptible to infection than females. <u>11.</u> Stress & people take corticosteroids → due to immune suppression.	<u>1.</u> Wounds. <u>2.</u> Nail injuries. <u>3.</u> Contaminated soil & instruments. <u>4.</u> Infectively sterilized act gut. <u>5.</u> Un hygienic conditions during parturition.
Diagnosis <u>في العلي</u>	✓ Zeil neilson stain - Tuberculin test - Culture in L.J media ✓ Malachite green with penicillin & 5 % glycerol in human type. ✓ Culturing of organism has specificity that approach 100% but growth of microorganism take <u>8 - 12 weeks</u> ✓ <u>Molecule-epidemiological identification</u> must be corned out to characterize the prevalent isolates in the country that help for implantation of specific effective program.	في العلي
Human vaccine	<u>BCG (Bacillus Calmette Guerin) :</u> ❖ Live attenuated strain of <u>M. bovis</u> given to children <u>at 1st 3 months</u> after birth who born in <u>Egypt not USA</u> . ❖ <u>No vaccine in A'</u> → because Tuberculin testing of animals not differentiate between infected & vaccinated A'.	
Preventive measures & Control	<u>In Animals:</u> <u>1.</u> Periodic tuberculin test in cattle at small & large herd level. <u>2.</u> Most tuberculin +ve reactors are eliminated by slaughter house. <u>3.</u> Disinfection of animal premises. <u>4.</u> Detailed P.M examination of all slaughtered cattle. <u>5.</u> Treatment of raw milk, products before consumption <u>6.</u> Cooking meat & meat products. <u>In human:</u> <u>1.</u> Health Education about danger of the disease & factors that spread it & control program. <u>2.</u> Notification & isolation & disinfection & chemoprophylaxis. <u>3.</u> X ray screening, health certificate, Biosafety during lab working.	<u>1.</u> Clean wounds. <u>2.</u> Give booster to persons who received toxoid. <u>3.</u> Disinfection of environment & sterilization of instruments. <u>4.</u> Hygienic disposal of A' manure. <u>5.</u> <u>Control of dis. In humans:</u> ✓ Avoid contaminated wound & un-sterilized surgical instruments. ✓ Vaccination of pregnant woman to <u>avoid neonatal tetanus</u> 3 doses of tetanus toxoid (4-6 weeks a part) start in 4 th month of pregnancy. ✓ <u>Immunization either active or passive.</u> <u>1) Active:</u> (formal toxoid in children as <u>DPT vaccine</u> given at 2 - 3 months of age 1 ml S/C & 3doses with 1 - 6 months interval. <u>2) Passive:</u> (human anti-tetanic serum or horse hyper immune serum) after wound contamination 1500 I.U - I/M & repeated twice weekly.

Control:

- 1) T.B control programs include special polices & valid analytical system to ensure the early identification to minimize the risk of transmission of organisms.
- 2) Test & slaughter → Tuberculin & Montoux (jelly) test for those under risk.
- 3) Disinfection of all possible areas with suitable disinfectants.

N.B:

- ✓ DPT vaccine protect against Diphtheria, Pertussis & tetanus.
- ✓ Booster dose at 18 Months.

Treatment

- ✓ No treatment in Animals.
- ✓ Humans:
 - Recently by introduction of new drugs & surgical removal of main foci.
 - Combination from streptomycin + Isoniazid or Isonicotinic acid hydrazine in proper dose 5 - 10 mg/kg daily for 1 year.

Human:

- ✓ 100.000 I.U of anti-tetanic serum - I/V - as soon as tetanus suspected to neutralize any toxin still free in the body.
- ✓ 25.000 I.U weekly until symptoms disappears.

Notes**Q. why milk is much more vehicle for T.B than meat?**

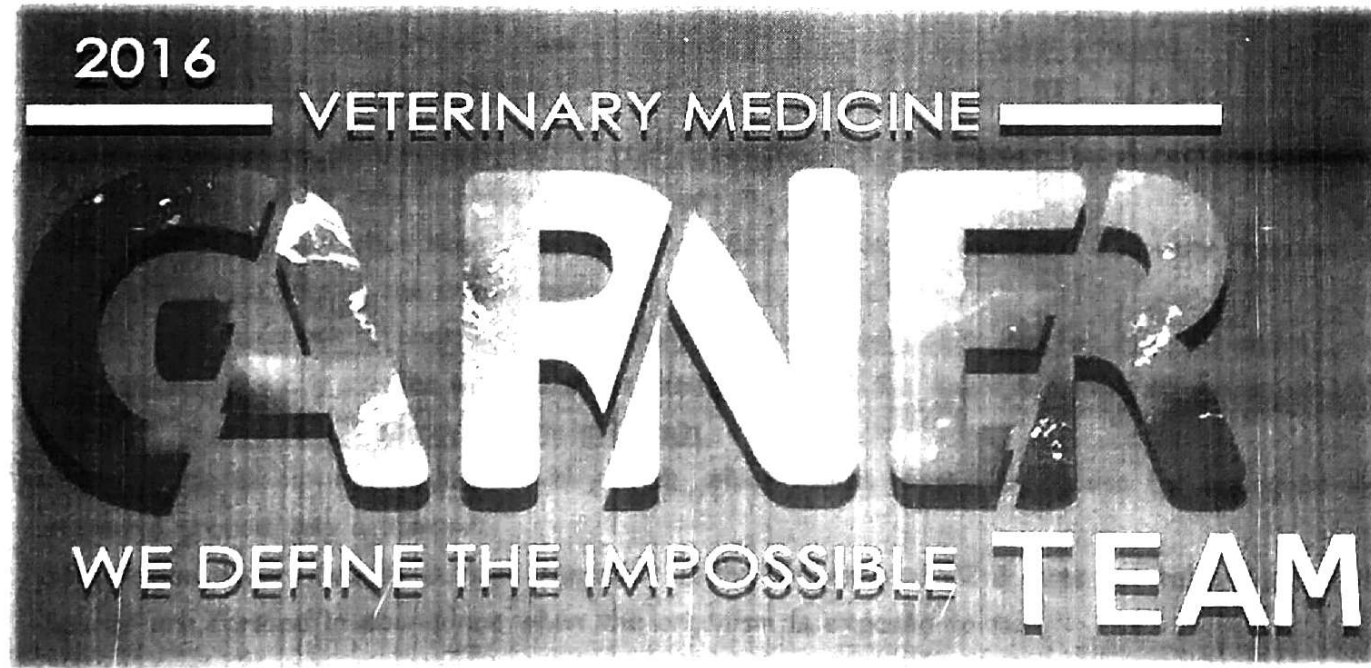
1. Cheap & available & regular consumed.
2. Ready-made food may be consumed without heating.
3. Used in preparation of many products & may be without pasteurization.
4. Easily infected with many pathogens.
5. Takes long period to reach consumer from farms.
6. Good media for growth of many M.Os.
7. May be adulterated with contaminated water.

Horses more susceptible A' for tetanus.

- Because organism or spores present in soil are mostly in horse manure & it can live in soil for many years.
- Spores killed by exposure to direct sun light within 12 days & by boiling for about 90 minutes.

مشتركة

محاضرة (٥)



Anthrax	
synonyms	<ul style="list-style-type: none"> ✓ Malignant pustule, Malignant carbuncle, Malignant edema, ✓ Wool sorter's disease, Splenic fever & Rack picker's dis.
Def.	<ul style="list-style-type: none"> ✓ Acute fatal highly infectious bacterial zoonotic disease. ✓ It is primarily a disease of <u>herbivorous animals</u> & <u>occurs in wild & domestic lower vertebrates</u> that usually occur as an infection of the intestinal tract. ✓ Accompanied with oozing of dark tarry blood from all natural orifices. (not clot) ✓ <u>In humans</u>: <ul style="list-style-type: none"> ○ Infection of skin (Malignant pustule) → 98% of cases. ○ Pneumonic air-borne form (Wool sorter's disease) & (rack picker's dis.) ○ Other forms → 2 % of cases.
Host & susceptibility	<ul style="list-style-type: none"> ✓ All herbivores animals ✓ Wild & domestic animals while <u>birds are rarely infected</u>.
Causative Agent	<ul style="list-style-type: none"> ✓ <u>Bacillus anthracis (Bioterrorism Agent)</u> → <u>Anthrax bacilli are biological weapons</u>. ✓ <u>Staining with Poly chrome methylene blue stain</u> → <u>Capsule is red & bacillus is blue</u>.
M.O	<ul style="list-style-type: none"> ✓ <u>G +ve, large bacilli, aerobic, non-motile, capsulated & spore forming aerobes & rectangular in shape.</u> ✓ Ovoid spores appear only in presence of oxygen O₂. ✓ Spores form readily when vegetative form is exposed to air is long-lived & is very resistant to environmental extremes & disinfectants (resist the unfavorable environmental conditions). ✓ Spores are resistant to chemical disinfectants & heat & persist in soil for 30 - 40 years. ✓ The spores of many strains will resist dry heat at <u>140°C for hours</u> & boiling or <u>steam at 100°C for 5-10 min.</u> However <u>autoclaving at 121°C destroys them in 15 min.</u> ✓ Anthrax spores can be produced in dry form, which makes them easy to use for biological warfare since they can be stored & ground into a powder. ✓ Sporulation occurs readily outside the body in the presence of O₂ & does not take place in the tissues. ✓ Spores are formed in abundance when the organism is exposed to air.

Carbuncle: circumscribed cavity in epidermis containing pus.
Furuncle: small suppurative inflammation on skin involving
Mainly hair follicle or sebaceous gland caused by Staph. aureus

Other agents used in biological wars	<ol style="list-style-type: none"> 1. <i>Bacillus anthracis</i>. (G +ve) 2. <i>Francisella tolerances</i>. (G -ve) 3. <i>Yersinia pestis</i>. (G -ve) 4. <i>Clostridium Botulinum</i>. (G +ve) <div> <p><u>Due to</u> (very stable, highly fatal, easy to produce /in expensive to Produce large quantity of M.O in short time & easy to weaponize).</p> </div>
Source of infection	<ul style="list-style-type: none"> • Anthrax spores are not normally found in the living animal, but once infected fluid, exudates, blood or tissues are shed into the environment, then spore formation will occur on exposure to atmosphere. • It is highly resistance to physical & chemical agents. Spores remain viable (can survive) in contaminated soil & material (wool, hair, hides) for many years (20-30 years) in some cases as Long as 50 years under dry conditions. <div> <p>→</p> <ol style="list-style-type: none"> 1. Blood, fluids & tissues of animals dying from the disease. 2. <u>Contaminated animal products</u> as: hair, wool, hides & skins. 3. Food & soil (dust) particles <u>contaminated with anthrax spores</u>. </div>
Reservoir Host	<ul style="list-style-type: none"> • Cattle, sheep & goats • Herbivorous animals are main reservoirs of infection to man.
Anthrax	<ul style="list-style-type: none"> • <i>Anthropozoonoses</i> → acc. To reservoir host. • <i>Saprozoonoses</i> → acc. To life cycle. • <i>Bacterial disease</i> → acc. To causative agent.
Mode of transmission	<ol style="list-style-type: none"> 1) <u>Direct Contact</u>: With infected animal, secretions & excretions or manipulation of animal products contaminated with anthrax spores through a skin lesion (generally a slight abrasion, scratch or small wound on an exposed surface of the usually occur during skinning or autopsying infected cattle or during shearing sheep). <u>A case was reported in a man contracted the infection from his dog that had fed on a dead sheep.</u> 2) <u>Inhalation</u>: Of spores in dust during wool sorting <u>or</u> from dried skin <u>or</u> hair or the use of dried cattle manure (<u>Gella</u>) as animal fertilizers. Spores are found in bone meal, soil, water & on vegetation. 3) <u>House flies & other biting flies</u>: May be responsible for the transmission of infection <u>mechanically</u> from animal to man. Some arthropods <u>such as horseflies may be involved in animal-to-animal spread.</u>

- 4) Bites of pet animals: Which have recently fed on the carcasses of animals dead of anthrax.
- 5) Laboratory infection: Accidental infections occur among laboratory workers from cultures & experimentally infected laboratory animals.
- 6) Man-to-man transmission: Is rare, one case was reported in a child contracting ocular anthrax while sleeping with father, who had an anthrax lesion (Malignant pustule). Workmen in tanneries may also carry the infection to members of their families. Infection occurred to a housewife while mending or washing her husband's clothes.

Susceptibility: Because of the nature of the industrial processes involved, men are more frequently affected with anthrax than women.

**Clinical
Signs**

According to the occupation, there are 2 basic clinical types of anthrax infection in man:

1) Industrial anthrax:

- Due to manipulation of animal products such as wool, hair, hides & skins.
- It affects mostly those engaged in industries of animal products such as those handling sheep wool, animal hair, pig bristles, hides, bones & other products of animal origin.
- It takes the form of a malignant pustule on the skin or acute pulmonary infection, depending upon the nature of industrial treatment of animal products.

2) Non-Industrial or agricultural anthrax:

- It affecting farmers, veterinarians (Vets), butchers, pathologists & those coming in contact with infected animals. It takes always the form of a malignant pustule.

Clinical forms of anthrax in man:

The incubation period is within 7 days but is usually less than 4 days:

- 1) Cutaneous form: 1-5 days.
- 2) Pulmonary or respiratory form: 1-2 days.
- 3) Intestinal: 12 hours to 5 days.
- 4) Nervous form.

Exo-toxin	Endo-toxin
All G +ve produce it	All G -ve produce it
Diffusible	Non diffusible
Steroid	Poly saccharide & phospholipid
Destroyed by heat	Not
Hard in toxicity	Low toxicity
Significant action	Not
May intoxicated by formalin	Not

1. Malignant pustule: (The cutaneous form 98% of human anthrax):

- There is no seasonal incidence with this form of anthrax. As infection occurs from exposure of the broken skin to contaminated animal products. So, it is expected that the lesion will be in the uncovered parts of the body & the site of the lesion depends upon the nature of the work (industrial occupation).
- Hide porters are frequently infected on the back of the neck. In butchers (slaughter-men) & pathologists, the hands, arms, fingers, wrists are often affected & the face or front part of the neck in those using contaminated shaving brushes.

The early symptoms of cutaneous anthrax are:

- Severe itching (cutaneous pruritic macule) on the exposed surface then becomes edematous & a small papule appears at the inoculation site surrounded by an area of erythema.
- Vesication takes place in which the vesicles contain clear yellow fluid. The vesicles increase rapidly in size & the color becomes dark red & finally a black central scar is formed.
- lesion may become 5 cm in diameter surrounded by a wide area of edema & later become hard but not particularly painful & if not treated by Oxytetracycline or ciprofloxacin & procaine penicillin, infection tends to spread rapidly to regional lymph nodes & blood stream resulting in septicemia & death within 5 - 6 days (case fatality rate : 5- 20%).
- **Malignant pustule:**
 - Rapid growth,
 - marked edema: Brawny, gelatinous & non-pitting,
 - central necrosis,
 - Non-suppurative,
 - Hemorrhage often painless.

2. Wool sorters' disease: (The respiratory form = pulmonary form = pneumonic anthrax).

- This is the most serious form of anthrax.
- Most cases are the result of inhalation of spores from wool, hair, or hides of infected animals.
- It is febrile respiratory tract disease. Initial symptoms resemble the common cold or flu (fever, cough, headache, vomiting, chills & weakness). After several days the disease may progress to severe breathing problems (dyspnea), profuse sweating, cyanosis, shock & death with 24 hours. Historically mortality in occupationally acquired illnesses has been around 89% with modern treatment methods the rate should be lower provided that diagnosis occurs in time.

Cyanosis:
In human plague &
In Anthrax

- A severe bronchopneumonia (patchy areas of hemorrhage consolidation in the lungs) together with enlargement of the regional lymph nodes with fever, shock & death in the majority of cases.
- Antibiotics are most effective if given before symptoms appear. An extended duration of antibiotic therapy is recommended because of the persistence of spores resistant to the action of antimicrobial agents.

3. Gastrointestinal anthrax: Febrile gastrointestinal disease.

- The infection occurs through GIT. It is contracted by ingestion of meat from infected animals but it is rarely occur.
- The symptoms include severe gastroenteritis with vomiting & bloody stools (M.R... 25-75%).

Both pulmonary & intestinal forms of anthrax are almost fatal & lead to death in the majority of cases.

4. Nervous form: In the form of meningitis.

- B. anthracis produces a powerful potent exotoxin composed of 3 parts.
- The disease is caused by the actions of three exotoxin subunits that are located on plasmid PXO1:

1. Factor I (The edema factor):

- Edema factor (EF) is a calmodulin-dependent adenylyl cyclase, which causes edema. The actions of EF also decrease phagocytic activity.

2. Factor II (The protective antigen):

- Protective antigen (PA) was so named because it is in the protective anthrax vaccines. The protective antigen is a protein subunit that binds to a cell and forms a membrane channel for edema factor and lethal factor to promote their entry into cells. Without it, edema factor and lethal factor cannot produce their effects.

3. Factor III (The lethal factor):

- Lethal factor (LF) is a zinc metallo-protease that cleaves mitogen-activated protein (MAP) kinases 1 & 2, leading to their inactivation, & inhibition of the MAP kinase signal transduction pathway causing death through an unknown mechanism. It is toxic for macrophages.

- ✓ All 3 factors released & cause disease.
- ✓ The toxin has been obtained in vitro & in vivo. Death by anthrax is caused by the toxin.
- ✓ Case fatality rate (CFR): If untreated: cutaneous 5 - 20 % & pulmonary 100% & intestinal 50%.

**Prevention &
control**

control of anthrax relies upon 4 main factors:

- 1) Early diagnosis, prophylaxis & effective treatment of the disease in man.
- 2) Eradication of the disease in animals (wool, hair, skin and hides as well as shaving brushes).
- 3) Elimination of industrial infection:
 - A. Disinfection of raw animal products.
 - B. Disinfection of the work places.
 - C. Education of the employees.
- 4) International measures.

1) Early diagnosis, prophylaxis & effective treatment of the disease in man.

1) History:

(Herbivorous A' + sudden death + dark terry blood from all natural orifices).

2) Careful diagnosis:

- ✓ Microscopical examination: في العملي و مهم
- ✓ Serological tests: (Agar gel precipitin inhibition test in man & Ascoli's test in animal) في العملي و مهم

3) Prophylaxis measures:

- ✓ Cell free vaccine:
 - ✓ culture filtrate containing protective Ag (factor 2)
 - ✓ Immunization of people who are in contact with wool, skin, hides, hair of animals potentially infected with anthrax.
- ✓ Wrights vaccine:
 - ✓ Sterile alum precipitated anthrax Ag
 - ✓ 3 S/C successive injections each 0.5 ml dose at 6 months interval.

4) Control of patients, contacts & environment:

- ✓ Report of local health authority (notification).
- ✓ Isolation until lesions is bacteriologically free from anthrax bacilli.
- ✓ Concurrent disinfection discharges from lesions & articles soiled there with spore require steam sterilization & burning for destruction.

2) Eradication of the disease in animals (wool, hair, skin and hides as well as shaving brushes)

A. Vaccination:

- a. Pasteur vaccine: (Pasteur 1 & Pasteur II).
- b. Simultaneous: mixture of culture filtrate & serum.
- c. Besridka vaccine: (attenuated spore vaccine suspended in saponin I.D in sheep & cattle & horse).
- d. Sterne vaccine: (live spore forming vaccine, potent & safe & rapid).

B. Early diagnosis of anthrax in A':

- a. Burying with lime, TH4 Tektroll, Virkos 26% phenolic compound 4 ml/L of water disinfectant, cleaner & sanitizer.
- b. Burning (the best).

3) Elimination of industrial infection:

A. Disinfection of raw A' products:

1. Wool or fleece:

- ✓ (Duckering process)
- ✓ Based on Eurich's observation that preliminary agitation of wool in worm water + soap for 20 min.
- ✓ Then exposed to 2 % formaldehyde gas or (5% formalin) at 40 c & drying in hot air oven (30 - 40 c) kill all spores in wool.

2. Hair:

- ✓ Boiling or autoclaving 3 hrs. Or worm formaldehyde gas 10 %.

3. Hides & skin:

a. pickling method (the Australian schotten fresh method)

- Skin exposed to mixture soln. of (2 % HCl + 10 % NaCl) for 2 days at 20 c kill spores but leaves harsh skin.

b. The English segmons Jones method:

- Immersed in HgCL₂ (0.02%) + 1 % formic acid for 24 hrs. & then in concentrated NaCl soln. /1hr.

c. Use of H₂S gas for 7 - 16 days.

B. disinfection of work places:

1. Disinfection of wates from factories dealing with A' products.

2. Suppression of dust.

3. Fan ventilation system in wool industries.

C. Health education of employees:

- ✓ Health education of workers to methods of transmission of anthrax & its prevention.
- ✓ Hygienic measures applications.
- ✓ Disinfection of clothes 1st before working.
- ✓ Pay attention to every skin wounds, abrasions, scratches for employees handling potentially contaminated articles.

4) International measures

- ✓ Sterilization of imported bone meal used as animal feed. Disinfecting of wool, hair, hides & other products when indicated formaldehyde, ethylene oxide & cobalt irradiation has been used.

Treatment

- ✓ Three types of antibiotics are approved for anthrax: Ciprofloxacin, tetracyclines (including doxycycline), & penicillins (procaine penicillin). For people who have been exposed to anthrax (60 days of one of these antibiotics) is given to reduce the risk or progression of disease due to inhaled anthrax.
- ✓ In adults: The initial therapy (IV) Ciprofloxacin 400 mg every 12 hrs or Doxycycline 100 mg every 12 hrs & one or two additional anti-microbial.
- ✓ In children: Ciprofloxacin 10-15 mg/kg every 12 hrs. Penicillin remains the drug of choice as (B-lactamase-producing strains).
- ✓ Generally, cutaneous anthrax responds vary satisfactory to treatment, while the intestinal & pulmonary forms are almost fatal. In case of cutaneous anthrax, it depends mainly on Procaine penicillin. Streptomycin may produce synergistic response. The patient with mild edema require 1-1.5 mega units I/M every 12 hours for 2 days.
- ✓ While on extensive edema on head, neck, respiratory tract, it require one-mega units every 6 hours.
- ✓ In case of pulmonary anthrax: it is essential to make an early diagnosis and the treatment must commence as soon as anthrax suspect. So, give 20 mega units over 24 hours by continuous drip & continue for 14 days or more to avoid reinfection bacteremia (The presence of living bacteria in the circulating blood).

Passive immunity: by given hyper-immune serum (Anti anthrax serum) may still be useful in treatment of systemic anthrax where toxic manifestations occur at a dose of 10-20 ml (I.V).

Items	RAT BITE FEVERS	
2 Diseases	Sodoku dis.	Haverhill dis.
synonyms	<ul style="list-style-type: none"> ✓ Rat poison, ✓ Spirillum fever, rat bite fever & spirillary fever. 	<ul style="list-style-type: none"> ✓ Strepto-bacillary rat bite fever. ✓ Strepto bacillary fever, rat fever, <u>or</u> epidemic arthritic erythema (Haverhill fever) occurs worldwide.
Def.	<ul style="list-style-type: none"> ✓ Bacterial disease of world-wide distribution. ✓ <u>Caused by</u>: Spirillum minus. ✓ <u>Transmission through</u> bite of infected rat. ✓ In Japanese, <u>So</u>: mean <u>rat</u> & <u>doku</u>: mean <u>poison</u>, Sodoku = Rat poison. 	<ul style="list-style-type: none"> ✓ Infection with <u>Strepto-bacillus moniliformis</u>, ✓ <u>Caused by</u>: <ul style="list-style-type: none"> ○ Bite of a rat <u>or</u> other infected rodent, <u>or</u> by ingestion of water <u>or</u> milk contaminated by <u>rats</u>. ✓ 3 outbreaks have been described.
Causative Agent	<ul style="list-style-type: none"> ✓ <u>Spirillum Minus</u>: ✓ Minute, short thick spirillar bacterium with one <u>or</u> more flagella attached at each pole. ✓ Motile, aerobic & can be cultured only vivo in mice & guinea-pigs. ✓ <u>May be stained with</u>: <u>methylene blue</u>, <u>Giemsa</u> & with <u>Silver impregnation techniques in tissues</u>. 	<ul style="list-style-type: none"> ✓ <u>Strepto-bacillus moniliformis (Strepto-bacillus morbificans or Strepto-thrix moniliformis)</u>: ✓ Non-motile, G-ve bacterium which <u>pleomorphic bacilli</u> may occur as short cocco-bacillary forms as well as in irregular chains. ✓ <u>Facultative anaerobe</u> & <u>slow growing on media</u> enriched with 10-30 % serum, blood <u>or</u> ascetic <u>or</u> other body fluids.
Reservoir Host & Source of infection	<ol style="list-style-type: none"> 1. Spirillum minus found in rats, mice & guinea-pigs & not seem to be pathogenic in animals. 2. <u>Rats</u> → reservoirs of infection & play an essential role in epidemiology of the disease. 3. M.O is found in <u>conjunctival fluid of rats</u>, so it could reach to <u>noses of rat</u> via <u>nasolacrimal duct</u> & <u>contaminate a bite wound</u>. 4. M.O found also in lymph nodes, salivary glands, peritoneal fluid & blood of animals & man. 5. Saliva of rats & other rodents <u>is source of infection for man</u>. 	<ol style="list-style-type: none"> 1. Rodents → reservoir of infection. 2. Rats harbor the agent <u>in naso-pharynx</u>. 3. Discharges from <u>naso-pharynx</u>, <u>middle ear</u> & <u>lungs</u> of infected <u>rats</u> are <u>source of infection</u>. 4. Contaminated milk <u>or</u> milk products <u>or</u> water with organism from rats also is a source of infection & was responsible on <u>epidemic</u>.

Mode of transmission	<ul style="list-style-type: none"> ✓ Infection occurs through bite of infected rodents, also human infection could be <u>transmitted by bites of weasels, dogs, cats, & other carnivores.</u> ✓ Recently contamination of <u>mouth parts</u> of these animals during feeding <u>or</u> catching the infected rodents. ✓ So, carnivores act as: <u>mechanical transmitters.</u> ✓ <u>Person to person transmission</u> → not occur, ✓ Disease occurs <u>in sporadic cases</u>, with worldwide distribution. 	<ul style="list-style-type: none"> ✓ Bite of infected rodents. ✓ Consumption of milk <u>or</u> milk products <u>or</u> water contaminated with organism from infected rats. ✓ disease almost always occurs in sporadic cases from bite of infected rats while, epidemic outbreaks of Haverhill can arise from ingestion of raw <u>or</u> unpasteurized milk <u>or</u> water contaminated by discharges <u>or</u> fecal materials of infected rats. ✓ <u>Person to person transmission</u> → not occur.
Disease in man & Symptoms (Signs)	<ul style="list-style-type: none"> ✓ I.P = <u>7- 21 days</u>, but may extend to <u>months.</u> ✓ Redness & swelling at site of bite wound. ✓ May heal spontaneously without complication before onset of symptoms, & may begin with suddenly onset of fever for few days, <u>but fever may recur several times over a period of 1 to 3 months.</u> ✓ Lymphadenopathy in regional lymph nodes & extensive & generalized red <u>exanthematous eruptions</u> may appear with each attack of fever, <u>especially on the chest & arms.</u> ✓ Although bite wound heals during the incubation period, it may be ulcerated & regional lymph nodes become swollen. ✓ Fever may accompany with <u>myalgia & arthralgia</u> especially on the side of the body affected by the bite. ✓ <u>Arthritis seldom occurs.</u> ✓ Complications: <u>very rarely occur in untreated cases</u> where affect kidney, lungs, testes & central nervous system. ✓ <u>Case fatality rate:</u> is 2-10 % in absence of treatment. 	<ul style="list-style-type: none"> ✓ I/P = <u>2 - 14 days.</u> & Mortality = <u>10 %</u> in untreated cases. ✓ <u>(I/P in original outbreak which was in Haverhill USA, caused by consumption of raw milk was 1- 4 days & rarely longer than 10 days).</u> ✓ Disease begins with clinical pictures similar to that of influenza. <u>(Flue like symptoms).</u> ✓ After an I/P, there is sudden onset of irregular fever, which may persist for weeks <u>or</u> months in untreated cases. ✓ <u>Exanthema (erythematous, usually maculo-papular) rash affecting palms of hands, feets, shins, ankles & face.</u> ✓ There is regional <u>lymphadenitis, myalgia, & arthralgia.</u> ✓ In most cases especially sever ones, <u>there is arthritis affecting more than one joint</u> (polyarthrititis, generalized arthritis), <u>so it is called "epidemic arthritic erythema".</u> ✓ Bite wound <u>may heal spontaneously</u> without complications. ✓ But, later may break down & lead to <u>necrosis & ulceration of site of inoculation, which is often painful & prolonged & occasionally ending in a subcutaneous abscess.</u> ✓ Possible complications of untreated cases are <u>endocarditis, pneumonia, anemia, abscesses & pleural affection.</u>

Prevention & control	<ul style="list-style-type: none"> ✓ <u>Rodent control (Derattization)</u> & preventing the infestation by rats of human dwelling. ✓ Taking general precautions <u>to avoid bitten</u> when <u>handling of laboratory animals</u>. ✓ <u>Prevention of rats from biting babies</u>. 	<ol style="list-style-type: none"> 1. Derattization. 2. Protection food & water from rodent contamination. 3. Pasteurization of milk. 4. Disinfection of water. 5. Laboratory workers should be instruct <u>the proper handling techniques of experimental animals</u>.
Treatment	<ul style="list-style-type: none"> ✓ Treatment of rat bites with <u>antiseptic & local antibiotic dressing</u>. ✓ Treatment of patients with <u>general antibiotics</u>. ✓ <u>Aureomycin</u> is the drug of choice, Although Penicillin, Erythromycin, Streptomycin & Chloroxy-tetracycline may be used. <u>(In spite of it is G -ve bacteria)</u> ✓ <u>Prognosis</u> is excellent with treatment. 	<ul style="list-style-type: none"> ✓ <u>Penicillin, Erythromycin & Tetracycline</u> are the used antibiotics. ✓ <u>Wound must be treated with local antibiotics & antiseptic dressing</u>.

Items	Pasteurellosis	Yersiniosis
synonyms	<ul style="list-style-type: none"> ✓ Shipping fever, transport <u>or</u> transit fever, ✓ <u>Stock-yard pneumonia</u>, <u>haemorrhagic septicemia</u> (cattle, lamb), ✓ bovine pneumonic Pasteurellosis, <u>or</u> ✓ avian, bird <u>or</u> fowl cholera & snuffles in rabbits, ✓ embraces a multiple of disease caused by different Pasteurella species in animals, birds & humans 	<ul style="list-style-type: none"> ✓ Yersinia pseudo tuberculosis & Yersinia enterocolitica. ✓ Genus Yersinia consists of 3 principal pathogenic species, <u>Yersinia pseudo tuberculosis, Y. enterocolitica & Y. pestis.</u> ✓ <u>Y. enterocolitica & Y. pseudo tuberculosis</u> are 2 principal pathogens of <u>human non-plague yersiniosis.</u> ✓ While <u>Y. pestis</u> is the sole pathogen of <u>human plague.</u>
Def.	<ul style="list-style-type: none"> ✓ <u>Disease in animals</u> usually occurs as a consequence of stress such as: overcrowding, chilling, transportation <u>or</u> as a result of a concurrent infection. ✓ <u>Human infections</u> occur after bites, scratches <u>or</u> licks from infected animals. <u>Infection</u> is common in <u>domestic & wild animals</u> but <u>uncommon in man.</u> 	<ul style="list-style-type: none"> ✓ <u>Pseudo tubercular Yersiniosis:</u> is a zoonotic bacterial disease Ch. by necrotizing, granulomatous abscesses, lymphadenopathy of ileo-cecal area with pain in <u>right lower quadrant of abdomen.</u> ✓ <u>Enterocolitic Yersiniosis:</u> is acute enteritis with fever, watery diarrhea & abdominal pain that may mimic appendicitis & chronic arthritis. ✓ <u>In adults, predominant symptom</u> is <u>Pseudo appendicitis.</u>
Causative Agent	<ol style="list-style-type: none"> 1) Pasteurella multocida (P. septic), 2) P. haemolytica, 3) P. pneumotropica, 4) P. ureae & other species. <ul style="list-style-type: none"> ✓ <u>Pasteurella</u> are small, non-motile, polymorphic, G -ve bacilli. ✓ <u>P. multocida & P. haemolytica</u> are <u>distributed world-wide.</u> 	<ul style="list-style-type: none"> ✓ <u>Yersinia pseudo tuberculosis</u> & <u>Yersinia enterocolitica</u> (O3, O5, O6, O8 & O9 serotypes). ✓ G -ve bacilli <u>or</u> cocco bacilli pleomorphic, non-capsulated, <u>motile at 25 °c but not at 37 °c</u>, aerobic & facultative anaerobic organism. ✓ Grow on blood, heart infusion, MacConkey & SS agar at room temp. & at 37 °c & in buffered saline <u>at 4 °c</u> specific media for Y. enterocolitica is <u>Cefsulodin- Irgasan Novobiocin (CIN) agar</u>, with colonies of <u>dark red center surrounded by a transparent border.</u>

		<ul style="list-style-type: none"> ✓ <u>P. pseudo tuberculosis</u> is killed by <u>heat (60°C in 10 minutes)</u> & by <u>ordinary disinfectant</u>. ✓ More than <u>50 serotypes</u> & <u>5 biotypes</u> of Y. Enterocolitic & 4 subtypes of P. pseudo tuberculosis.
Reservoir Host & Source of infection	<ul style="list-style-type: none"> ✓ <u>Animals & man</u> are <u>reservoirs</u>. ✓ <u>Organism</u> survives <u>only a very short time</u> in environment. ✓ <u>Dogs & cats</u> rarely suffer from Pasteurellosis (except of wound infection) & are <u>healthy carriers</u>. ✓ <u>The agent</u> is harbored in <u>the upper respiratory passages</u>. ✓ <u>P. multocida</u> is wide-spread <u>among domestic & wild ruminants</u>, <u>swine, dogs, cats, rabbits, laboratory rodents</u> & <u>a wide variety of birds (domestic, waterfowl & free-flying)</u>. ✓ <u>Principal hosts</u> for <u>P. haemolytica</u> are <u>cattle, sheep and goats</u> & also the organism has recovery from <u>swine fowl, horses, camels & humans</u>. ✓ <u>P. pneumotropica</u>: is a <u>commensal organism</u> in <u>rats, cats, hamsters, dogs & rarely in horses, calves & man</u>. ✓ <u>P. ureae</u>: the main host is <u>man</u>. ✓ Organism is found in <u>respiratory tract of horses</u>. ✓ <u>Fowls</u> acquired infection by <u>aerosols from carries fowl</u>. 	<ul style="list-style-type: none"> ✓ <u>Natural reservoirs</u> of <u>Y. enterocolitica</u> include a variety of domestic & wild species. <u>Prominent hosts</u> are pigs, rodents, rabbits, sheep, goats, cattle, horses, dogs & cats. ✓ <u>Y. pseudo tuberculosis</u> is found in <u>many farm animals</u>, rabbits, rodents & deer & also has been found <u>extensively in birds</u>, including turkeys, ducks, geese, pigeons, pheasants & canaries. <u>Wild rodents & swine</u> are important reservoirs. ✓ Organisms are localized in <u>oro-pharyngeal cavities & gastrointestinal tract</u> of reservoir animals. ✓ <u>Organisms</u> are excreted <u>into faeces</u> to allow <u>faecal- oral transmission</u>. ✓ <u>Y. enterocolitica</u> is more frequent found in <u>tongue & tonsils of pigs</u>. So, pork & raw intestine of pigs are important source of infection. ✓ <u>Milk</u> could be contaminated with Y. enterocolitica through <u>faecal contact or through blood stream</u> to <u>mammary glands</u> or through <u>localized mastitis due to this infection</u>. ✓ Organism can multiply <u>at refrigerator temp</u>. ✓ Pasteurization usually <u>kills the agent</u>, but if <u>milk</u> contains <u>large numbers of Y. enterocolitica</u>, some bacteria can survive in pasteurized milk & can be a source of infection.

Mode of transmission

- ✓ Transmission to man is primarily via bites or scratches from dogs & cats & less frequently from other animals.
- ✓ Other routes of transmission have also been described.
- ✓ P. Multocida infections may be acquired from animals by their licking on mucosal surface or on injured skin.
- ✓ Cases of P. multocida meningitis & ear infections have been associated with dog & cat licks to the faeces & ears, & of endocarditis via the licking of leg ulcers by a dog.
- ✓ Man may also become infected from the respiratory aerosol of infected cattle, sheep, pigs, poultry & cats.
- ✓ Also, direct contact with respiratory, digestive or product of infected animals is a route of transmission.
- ✓ Non-zoonotic transmission (Man to man transmission) may be occurring among patients with respiratory diseases.
- ✓ Pasteurella multocida is the most commonly reported zoonotic infection among other Pasteurella species, resulting mainly from infected dog & cat bites.
- ✓ Most cats & dogs are healthy carriers of Pasteurella & harbor the agent in oral cavity.

- ✓ Transmission of Y. enterocolitica infection occurs through ingestion of contaminated food or water &
- ✓ Less commonly, by direct contact with infected animals or patients.
- ✓ Carrier animals especially puppies & kitten are important source of human infections.
- ✓ Person to person spread of yersiniosis rarely occurs.
- ✓ Transmission of Y. pseudo tuberculosis occurs by ingestion of contaminated food or water (fecal-oral route).

**Disease in
man
&
Symptoms
(Signs)**

- ✓ I/P = 24 - 48 hours from bite.
- ✓ Main cause of human Pasteurellosis is P. multocida.
- ✓ Main clinical symptoms consist of the infection are infected wound caused by: bites of dogs or scratches of cats or bites of other animals, disease of respiratory system & localized infections in different organs & tissues.
- ✓ Most clinical cases of Pasteurellosis are presented as infected wounds after bite (I.P = 24 - 48 hrs.) → swelling reddening, & intense pain in the region of wound.
- ✓ Inflammatory process penetrates into deep layer of tissues cause necrosis.
- ✓ There is lymphangitis & lymphadenitis.
- ✓ Local complications as: osteomyelitis, tenosynovitis & septic arthritis.
- ✓ P. multocida may also aggregate the diseases in respiratory system as: bronchitis, bronchiectasis & pneumonia.
- ✓ Septicemia, meningitis & endocarditis are extremely rare.
- ✓ Most affected age group is over 40 years, inspite of the fact that bites are more frequent in children & younger people.
- ✓ Occupational group at risk from animal bites or other injuries & infections arising from indirect contact with animals, include: veterinary surgeons, laboratory workers, farmers & in general, any individuals working with wild or domesticated animals.
- ✓ Recent reviews & case reports of infection in pregnancy was described.

- ✓ Pseudo tuberculosis yersiniosis, the most common clinical form is mesenteric lymphadenitis or pseudoappenditis, with acute abdominal pain in right iliac fossa, fever, & vomiting.
- ✓ Some patients presented with diarrhea, erythema nodosum & arthritis.
- ✓ At laparotomy: Normal appendix - enlarged & inflamed mesenteric lymph nodes accompanied with inflammation of ileum.
- ✓ Rarely conjunctival or pulmonary form of infection.
- ✓ Enterocolitic yersiniosis, with acute enteritis with watery diarrhea lasting 3 to 14 days, the blood may be present in the stool, vomiting, joint pain & cutaneous eruptions are seen in young children.
- ✓ In older children & adults, the pseudo appendicitis syndrome with pain in right iliac fossa, fever & leukocytosis, are predominant symptoms.
- ✓ Erythema nodosum, arthritis or extra-intestinal infections are also common.
- ✓ Septicemia is rare form of Yersiniosis.
- ✓ Septicemic patients may develop hepatic or splenic abscesses with frank icterus or sub icterus with a painful hepatomegaly.
- ✓ A new form of Yersiniosis called far Eastern scarlatinoid fever Ch. by fever, a scarlatiniform eruptions, acute polyarthrititis and arthralgia.

Prevention & control	<ul style="list-style-type: none"> ✓ Elimination of stray dogs & cats can reduce the chance of bites & therefore prevent some cases. ✓ Education of children & informing pet owners on how to avoid animal bites. ✓ Prevention of bites, adequate wound care when bites have occurred and use of appropriate antimicrobial drugs. ✓ Veterinarian & other persons working <u>or</u> dealing with animals <u>should be careful of infection from bites.</u> ✓ Adequate ventilation. Mask may be used in poorly ventilated houses of diseased poultry. ✓ Control the disease in animals based on adequate management of herds or poultry farms. ✓ Immunization against Pasteurellosis is practiced in host species subjected to epidemic disease, especially cattle & fowl. ✓ Bacterin (chemically killed broth of Pasteurella with an oil adjuvant can offer solid immunity against hemorrhagic septicemia). <u>Also, live attenuated vaccine is now available.</u> ✓ <u>Attenuated live vaccines give better immunity than bactrins.</u> ✓ Immunity depends on <u>selection of strains of Pasteurella</u> within the <u>serotypes that cause the disease.</u> ✓ Use of <u>PI3 vaccine</u> & <u>Bacterin of P. multocida & P. haemolytica</u> has been recommended for <u>control of shipping fever in beef calves</u> (vaccination at 4 months & re-vaccinated a month later) 	<ol style="list-style-type: none"> 1. Application of hygienic measures to prevent food borne infection. 2. Rodent control. 3. Prevent contamination of food or water. 4. Heat treatment of all food of animal origin. 5. Recognition that pets constitute a hazard, particularly to young children, may go some way to diminish incidence of yersiniosis. 6. Heat treatment of milk and its products. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>N.B:</p> <ul style="list-style-type: none"> ✓ Infections of <u>Y. enterocolitica</u> occur in sporadic <u>or</u> epidemic outbreaks. ✓ Children & adult & both sexes are susceptible to Y. enterocolitica infection. ✓ Young ages are more often infected. ✓ Infection due to <u>Y. pseudo tuberculosis</u> is the rarest of the yersiniosis. ✓ Majority of patients have been <u>in children aged 5-15 years</u> mostly in <u>Europe.</u> ✓ Males are affected <u>3 times</u> more often than females. ✓ Most cases occur <u>in winter.</u> </div>
Treatment	<ul style="list-style-type: none"> ✓ Highly susceptible to Penicillin & Ampicillin. (In spite of G -ve). ✓ Local wound treatment with or without systemic antibiotics 	—

Items	Cat Scratch disease (CSD)
synonyms	<ul style="list-style-type: none"> ✓ Cat scratch fever, ✓ Benign inoculation lympho-reticulosis, ✓ Cat scratch syndrome, ✓ Cat adenitis, regional lymphadenitis, cat claw fever.
Def.	<ul style="list-style-type: none"> ✓ Direct emerging zoonosis, ✓ <u>Ch. by</u> pyrexia, persistent regional lymphadenopathy & <u>skin lesions as:</u> papule, small vesicle & ulcer on the site of cat scratch <u>or</u> bite. ✓ The disease is <u>world-wide, & endemic in Europe, Africa, Australia & Japan.</u>
Causative Agent	<ul style="list-style-type: none"> ✓ Bacterium appears to occur as <u>commensal in buccal cavity of cat less than 1 year of age.</u> ✓ Causative agent of cat scratch disease (CSD) has remained unknown for a long time. ✓ The agent of CSD has previously been associated with a fastidious G -ve rod bacterium, Afipia felis. However, A felis has rarely been isolated from patients of CSD. ✓ Recent investigation confirms that Bartonella henselae formerly named <u>Rochalimaea henselae</u> is a causative agent of CSD. ✓ <u>Bartonella henselae:</u> ✓ Small intracellular G -ve, non-motile, pleomorphic bacilli arranged in the forms of Y-shape, chains <u>or</u> clumps.
Reservoir Host & Source of infection	<ul style="list-style-type: none"> ✓ <u>Cat</u> is a natural reservoir. ✓ <u>Without doubt, cats play an important role in the epidemiology of the disease.</u> ✓ <u>Cats implicated in human cases were healthy animals, almost always young, that did not react to the Hanger-Rose intradermal skin.</u> ✓ There is doubt about whether <u>cat</u> is as <u>host</u> for <u>Bartonella henselae</u> or simply as a mechanical vector. <u>Recently B. henselae was isolated from the blood of a healthy cat.</u>
Mode of transmission	<ul style="list-style-type: none"> ✓ Transmitted to man through scratch or <u>bite of cats</u>. Most of cases (90%) associated with contact <u>with cats especially kitten.</u> ✓ Rarely CSD followed by trauma or skin wound induced by contaminated thorn or splinter, barbed wire or pins. ✓ Cat fleas may play a role in the transmission.

<p>Disease in man</p> <p>&</p> <p>Symptoms (Signs)</p>	<ul style="list-style-type: none"> ✓ I/P = 7 - 20 days from cat scratch or bite. ✓ CSD varies in severity from a benign, self-limiting disease to severe disseminated disease. ✓ CSD occurs as both typical and atypical disease. <p>1. Typical CSD:</p> <ul style="list-style-type: none"> ○ Occurs in an Immune-competent host ○ Ch. by round red-brown papules, pustules or vesicles surrounded by partially healed ulcer at the site of inoculation, after 1 - 2 weeks there is a regional lymphadenopathy without lymphangitis. ○ Lymphadenitis is generally unilateral and commonly involved cervical, axillary, inguinal, femoral & pre auricular or any lymph nodes in the path of lymphatic drainage from a site that has been inoculated with B. henselae. ○ Swelling in lymph node is generally painful & suppurates in some patients, persists for periods ranging from a few weeks to a few months. ○ A high proportion of patients with CSD show signs of fever (short-lived), & less frequently chills, anorexia, malaise, generalized pain, vomiting & abdominal cramps. <p>2. Atypical CSD:</p> <ul style="list-style-type: none"> ○ Parinaud's Oculo-glandular syndrome (POGS) is a fairly common presentation of atypical or complication of CSD, which consists of unilateral conjunctivitis with a regional (Pre auricular) lymphadenopathy. ○ There is granulomatous lesion of palpebral conjunctiva of affected eye. POGS is a predictable self-limited infection. ○ Visceral localization with hepatic localization results in granulomatous hepatitis & splenic & deep lymphatic & osseous localization is an atypical form of CSD that occurs in Immuno-competent patients who present with fever of unknown origin. ○ CSD encephalopathy & neuro-retinitis are unusual forms of atypical CSD. <p>3. Systemic and severe forms of CSD:</p> <ul style="list-style-type: none"> ○ Observed in children & adults, both Immuno-competent & Immuno-suppressed patients. ○ Infection of Immuno-compromised patients with B. henselae is severe & occasionally fatal disease.
<p>Prevention & control</p>	<ul style="list-style-type: none"> ✓ Avoid scratches or bites of cats during playing, handling or caring a cat. ✓ Immuno-compromised patients should avoid contact with cats.
<p>Treatment</p>	<ul style="list-style-type: none"> ✓ CSD is a self-limited disease in most cases & ✓ There is no controlled study regarding the antibiotic treatment of this disease. ✓ There is not currently a recommended antibiotic treatment for cat-scratch induced wounds & currently recommended antibiotics treatment for animal bites (such as amoxicillin + Clavulanate) have not been shown to be effective for prevention of cat-scratch disease.

Items	Human Plague (pest)
synonyms	✓ Pest, Black Death, Great Death & Pestilential fever.
Def.	<ul style="list-style-type: none"> ✓ Acute highly fatal <u>communicable zoonotic bacterial disease</u> affecting mainly <u>wild rodents & commensal rats</u>. ✓ It is primarily a disease of <u>rodents, small animals</u> & man is affected <u>incidentally</u>. ✓ Plague continues to be <u>a threat to international health</u>.
Causative Agent	<ul style="list-style-type: none"> ✓ <u>Yersinia pestis (Pasteurella pestis) or (plague bacillus)</u>. ✓ G-ve, bipolar staining, grows & multiplies in <u>bile media</u>, low resistance, easily <u>killed by</u> sun rays (exposure to direct sunlight for hrs.) & dehydrate at low temp. ✓ <u>Bacilli</u> occur in abundance in buboes, blood, spleen, liver & other viscera of infected individual. ✓ Occur in <u>sputum</u> in cases of <u>pneumonic plague</u>. ✓ <u>Virulence of organism</u> is that related to its ability to <u>produce exotoxin, endotoxin & a substance called: (Fraction 1)</u>
Source of infection	✓ Plague bacilli can survive & multiply in <u>the soil of rodents' burrows</u> where microclimate & other conditions are favorable. However, it may remain viable for months in <u>flea-faeces</u> .
Reservoir Host	<ul style="list-style-type: none"> ✓ Wild rodents are natural reservoir of plague. ✓ In wild rodents disease is maintained & spread by the resistant species of wild rodents, <u>i.e. by rodents, which have become immune to plague</u>. ✓ <u>The susceptible ones die of the disease, resistant rodents give birth to young ones</u> that are also <u>immune to plague</u>. ✓ Immunity seems to disappear <u>after 2 to 3 generations</u>.

Epidemiological cycle	<p>Disease in rodents (rats & mice) has 3 types of plague cycle are recognized:</p> <p>1) Wild (sylvatic) plague cycle:</p> <ul style="list-style-type: none"> ✓ Infection existing in nature, away from human populations & their activities. ✓ Exists only within different species of wild rodents (rats resistant & sensitive) naturally infected with the causative agent, where transmission occurs by <u>change of fleas</u>. ✓ Wild rodents are rarely kept in contact with man, except when hunted <u>or</u> trapped. ✓ Man accidentally gets the infection in this phase. <p>2) Rural plague cycle:</p> <ul style="list-style-type: none"> ✓ Plague passes from <u>wild rats</u> to <u>village rats</u> by bite of rat-flea (<u>X. cheopis</u>). ✓ Accidental passage of infection <u>to man</u> occurs by <u>rat-flea bite</u>. <p>3) Urban plague cycle:</p> <ul style="list-style-type: none"> ✓ Infection is found in different species of rats & mice, which passes rapidly from <u>rat to rat</u> by the intermediate of <u>Xenopsylla cheopis</u>. ✓ Human flea (pulex irritans) <u>has a role in propagation of the disease</u>. <p>N.B: fleas are intermediate biological invertebrate Vector (not vehicle).</p>	
Rodents	<p>1. wild rodents:</p> <ul style="list-style-type: none"> ✓ Incriminated as the main reservoir. 	<p>2. Commensal rodents:</p> <p><u>Commensal rodents which live close to man:</u></p> <ol style="list-style-type: none"> 1) <u>Rattus rattus rattus</u> (Black <input type="checkbox"/> or <u>House rat</u> <input type="checkbox"/> or <u>English rat</u>) 2) <u>Rattus rattus norvegicus</u> (Norway <input type="checkbox"/> or <u>Brown</u> <input type="checkbox"/> or <u>Bam</u> <input type="checkbox"/> or <u>Sewer rat</u>) 3) <u>Rattus rattus alexandrinus</u> (Egyptian <input type="checkbox"/> or <u>Roof</u> <input type="checkbox"/> or <u>Alexandrian rat</u>) 4) <u>Rattus rattus frugivorus</u> (fruit rat) 5) <u>Arvicanthus niloticus</u> (field rat) <input type="checkbox"/> or voles. 6) <u>Acomys cahirinus</u> (Cairo spiny rat <input type="checkbox"/> or mouse) 7) <u>Mus musculus</u> (house mouse).

Rodents (Rat)

- ✓ Act as natural reservoir hosts of human infection.
- ✓ **Man** infected by the transmission of infection from rats (Urban plague) by means of rat-fleas (*Xenopsylla cheopis*).
- ✓ If sylvatic plague becomes epidemics in wild rodents, disease spread over to rats, which are normally closely associated with man **i.e.** rat act as a contact between wild rodents & man.
- ✓ When specific natural host (rats) eliminated ☐ died ☐ killed, fleas will transfer themselves to other host like man.

During an outbreak of human plague, numerous foci of infection appear in areas remote from the primary one due to:

- 1) Transport of rats ☐ fleas from infected country to another.
- 2) Movement of persons infested with rat-fleas.

Plague in rodents:

- ✓ Rats not show any marked symptoms until they are near death.
- ✓ Signs: they stagger & become easy to catch & seek a dark corner to hide.
- ✓ Lesions observed PM examination:

1) **In acute plague in rats:**

- Congestion of S/C blood vessels.
- Swelling of axillary, groin, pelvic & neck lymph node (Buboes).
- Large dark spleen & granular liver (fatty liver with yellow necrotic foci).
- Pleural effusion.

2) **In chronic plague in rats:**

- Purulent or caseous foci in form of small abscesses in liver, spleen & mesenteric Ln.

Disease in animals

- ✓ In the form of septicemia ending with death. (You must exclude Tularemia).

Mode of transmission:	<ul style="list-style-type: none"> ✓ The epidemics of plague in man always <u>preceded by epizootic among rats</u>. ✓ <u>As soon as the specific natural host (rats) die or eliminated, infected hungry vectors (fleas) are forced to seek another hosts including man for food. The result will be bubonic form of plague.</u> <p>1) Vector transmission (Oriental rat-flea adult = Xenopsylla cheopis)</p> <ul style="list-style-type: none"> ✓ Transmitted to man mainly by bite of infected rat - fleas. ✓ Plague bacilli are inoculated into skin during the act of feeding as: bacilli multiply in the insect vector, <u>called (biological transmission) i.e. Meta Zoonoses.</u> <p>2) Mechanical transmission:</p> <ul style="list-style-type: none"> ✓ <u>Uncommon mode of transmission.</u> ✓ May occur during act of feeding by rat-flea, when plague bacilli may be transmitted <u>mechanically from the contaminated mouth-parts (proboscis) of flea on to the skin of human host or the site of the bite wound.</u> <p>3) Droplet infection:</p> <ul style="list-style-type: none"> ✓ Man to man transmission of infection may result from inhaling air-borne droplets coming out from patients suffering from pneumonic plague <u>or bubonic plague which terminates as pneumonic plague.</u> ✓ Air-borne droplets from human patients <u>or household pets (especially cats) with plague pharyngitis transmit dis. in both sides.</u>
Source of infection to man	<p><u>May be one of the following:</u></p> <ol style="list-style-type: none"> 1) Infected rat-fleas (Xenopsylla cheopis) -> Bubonic plague. 2) Tissues of infected rodent (rat-rabbit) 3) Air-borne droplets (the exhaled droplet from patient and their sputum).

Host factors:	<ol style="list-style-type: none"> <u>Age & Sex:</u> <ul style="list-style-type: none"> All ages & both sexes (male & female) are susceptible. <u>Immunity:</u> <ul style="list-style-type: none"> Man has no natural immunity. An attack of the disease may give life-long immunity. Antibodies develop <u>during 1st 7 days of illness</u>. <u>Movement of the people:</u> <ul style="list-style-type: none"> Plague is associated with the movement of people & can go by sea <u>or</u> land. <u>Rat & rat-fleas</u> are transported in this way. It is possible for a person to acquire disease & become ill thousands of miles away where plague would be unexpected. <u>Environmental factors:</u> <ul style="list-style-type: none"> A mean <u>temp.</u> Of <u>20-35 °c</u> & <u>a relative humidity of 60% & above</u> are considered being favorable for <u>the spread of plague & viability of M.Os</u> (Summer season is favorable for the spread of plague than winter season) (hibernating rodents). <u>Insect Vector:</u> <ul style="list-style-type: none"> Vector of plague is <u>rat-flea (Xenopsylla cheopis)</u> as <u>invertebrate vector</u>. Both sexes of rat-flea transmit the disease.
mechanism of plague transmission (Blocked flea):	<ul style="list-style-type: none"> ✓ A flea may ingest up to <u>0.5 mm³</u> of infected blood, which may contain <u>a huge number of plague bacilli</u>. ✓ <u>Plague bacilli</u> multiply enormously in rat-flea & may block <u>pro-ventriculus of fleas</u>, forming <u>an obstruction mass</u>. Called (blocking phenomena). Such a flea is called a (blocked flea). ✓ Blocked flea, later on faces starvation & death <u>because it is unable to obtain a blood-meal</u>. ✓ In its efforts to bite & suck blood again, it inoculates (regurgitates) plague bacilli each time it bites. ✓ <u>An infected flea</u> may regurgitate 11,000 - 24,000 organisms. A blocked flea is an efficient transmitter of plague. ✓ A partially blocked flea is more dangerous than a completely blocked one (because it can live longer). ✓ <u>Infected flea may live for at least one year</u>, sometimes for about <u>4 years</u> in the <u>rodents' burrows</u> where favorable <u>microclimate</u>. ✓ Many spp. of flea merely become infected, blockage is never evident & they rarely become pestiferous. ✓ Other remains infected throughout their entire lives & never become blocked. ✓ Fleas avidly draw blood, which fills their alimentary canal & appears at anus & so plague bacilli may be discharged through their anus with infected blood. ✓ Fleas may carry plague bacilli in their intestinal tract for long time & become blocked later. ✓ Due to relationship between <u>flea & plague</u> appearance of disease from season to season <u>in hibernating rodents</u> (Wild rodents) <u>can be explained</u>. ✓ Self-purification of fleas engorged with blood containing plague bacilli may occur. Due to bacteriophages, which have entered flea stomach causing lysis of plague bacilli. ✓ The bacteriophage eliminates from <u>60-70% of plague bacilli in 1 -3.5 months</u>. ✓ <u>Live infected fleas</u> carried either on <u>persons</u> or in <u>bedding of travelers</u> who have lived in plague houses or had visited them could spread infection at a distance.

Clinical picture
in man

Human plague has 3 major clinical manifestations after I/P varies from 2-6 days.

1. Bubonic plague: (Skin form)

- Bubo: An enlargement of a lymphatic gland, usually in groin or axilla, often going on to suppurative inflammation.
- Constitutes about 75% of clinical cases of disease in man. **(Most common type of the disease).**
- Infected rat-flea usually bites on lower extremities & injects the bacilli → lymphatic glands seize the bacilli.
- Primary bubo usually occurs in groin (when bite occur at lower extremities) & less often in axilla or neck (when bite occur at upper extremities), depending upon site of bite by fleas.
- In buboes, organism multiplies enormously causing local necrosis & abscesses formation (A localized accumulation of pus due to infection).
- Painful enlargement of Ln. draining at site of inoculation. When suppuration occur, considered a favorable sign.
- Bacilli may escape from Ln & invade blood stream producing generalized infection & **death occurs from acute cardiac failure.**
- Bubonic plague cannot spread from person to person, as bacilli are locked up in buboes & don't find a way of exit.
- Fever is usually present (febrile lymphadenopathy).

2. Pneumonic plague:

- Communicable form & highly fatal.
- Occurs due to inhalation of infected droplet from infected patient to another through coughing or sneezing or as a complication of bubonic Septicemic plague.
- Bacilli spread rapidly through lymphatic until localizes in the lungs. Intense congestion of air passages with haemorrhagic exudate in alveoli & bronchi.
- Malaise, headache, nausea, coughs & expectorations characterize the disease & Sputum is tinged with blood.
- Death occurs on 4 or 5 day or earlier **from suffocation.**
- Body exhibits extreme cyanosis in latter stage from which disease takes the name **(Black Death)**
- Pneumonic plague is highly infectious & spreads from man to man by droplet infection.
- Plague bacilli are present in mucoid bloody sputum. In this form the buboes are normally absent.
- Humidity increases viability of the organisms with a subsequent rapid man to man transmission.
- **Bubonic plague may be converted to pneumonic form → Septicemia.**

3. Septicemic plague:

- Occurs when the organism spreads hematogenously to virtually every' organ in the body.
- *Yersinia pestis* can survive & replicate within mononuclear leukocytes.
- No peripheral buboes However, bubonic plague may develop into Septicemic plague in the face of overwhelming infection.
- Plague toxins profoundly affect the patient.
- Fever, Nose bleeding (epistaxis), diarrhea & other symptoms. It is of short duration 18 hrs. To 3 days & invariably fatal.
- Epidemics of bubonic plague in man are preceded by or associated with epizootics in rodents.
- The great animal mortality so, created in rodents favors the migration of fleas to man seeking for food.

Diseases cause Nose bleeding or epistaxis	<ol style="list-style-type: none"> 1. Septicemic form of plague. 2. Yellow fever. 3. Complicated form of leptospirosis. 4. Endemic relapsing fever. 	Diseases cause Cyanosis	<ol style="list-style-type: none"> 1. Anthrax. 2. Pneumonic form of plague.
Period of communicability	<ul style="list-style-type: none"> ✓ Flea may remain infective for months or years under suitable conditions of <u>temp. (20-35°C) & a relative humidity of 60% & above.</u> ✓ Bubonic plague is rarely transmitted directly from person to person <u>unless</u> there is contact with pus from <u>suppurating buboes</u>. <u>Pneumonic plague</u> may be highly communicable under appropriate climatic condition, overcrowding & bad ventilation facilitates transmission of infection. 		
Diagnosis	✓ في العملي بالتفصيل		
Prevention & control	<ul style="list-style-type: none"> ✓ Aims to reduce the likelihood of people being bitten by infected fleas or of being exposed to pneumonic plague patients. ✓ Educate the public in enzootic areas on mode of human exposure, preventing access of rodents to food & shelter through proper strong & disposal of garbage & refuse. ✓ Avoid flea bites by using insecticides & repellents. ✓ Education of the public is an essential part of any plane control program. ✓ Education should aim at providing the public with the facts about plague, reporting of dead rodents & suspected human cases. ✓ Rat suppression by poisoning: Rat control should always be preceded <u>or</u> accompanied by measures to control fleas. ✓ Anti-rodent measures: are given elsewhere. ✓ Fleas may be destroyed by insecticides such as DDT (10%) dust, Malathion (5%) powder. Spraying of houses by insecticides should be carried as to cover the entire floor area, walls, back of doors, rat runs, clothing, bedding and pets. ✓ Rat's burrows should be insufflated <u>with insecticidal dust</u> using a dust blower. ✓ Insecticidal spraying up to the radius of 8 km. around each infected locality is adequate. <p>Vaccination:</p> <ul style="list-style-type: none"> • <u>Valuable preventive measure.</u> <ol style="list-style-type: none"> 1. Persons should be protected by a prophylactic vaccination: Haffkin s vaccine which is a <u>heat Killed broth culture antigen of highly virulent strains of Yersinia pestis</u> confers protection for <u>at least 6 months</u>. Given S/C in 2 doses 0.5 & 1.0 ml. at an interval of 7-14 days. Booster doses are recommended 6-monthly for persons at risk. 2. A live attenuated plague vaccine (Otten's vaccine) is used as single S/C injection of 0.1 ml. It is protective for around 6 months to be given to at-risk groups, annual reinforcing is recommended. 		

	<ul style="list-style-type: none"> ✓ Report to local health authority. ✓ Isolation: Although most bubonic plague patients are non- infectious, isolation is recommended whenever possible. ✓ Patients with pneumonic plague, strict isolation with precautions against air-borne spread is required <u>until 3 full days of appropriate antibiotic therapy completed.</u> ✓ Concurrent disinfection: Of sputum & purulent discharges & articles soiled therewith. Bodies of persons who died of plague should be handled with strict precautions. ✓ Quarantine: Those who have been in household or face-to- face contact with patients with pneumonic plague should be provided chemoprophylaxis & placed under observation for 7 days. ✓ Protection of contacts: Contacts of bubonic plague patients should be disinfested with insecticides. Contacts should be provided with chemoprophylaxis using antibiotic or sulfonamides daily for 1 week. ✓ Dust the rat runs, soil of rodents' burrows, harborages & burrows in & around known <u>or</u> suspected plague areas with insecticides for flea control. Dusting of houses, household furnishing. ✓ Chemoprophylaxis: It is valuable preventive measure should be offered to all plague contacts, medical, nursing & public health personnel exposed to the risk of infection.
Treatment:	<ul style="list-style-type: none"> ✓ It should be started without delay. ✓ The drug of choice is Di-hydro-streptomycin & Tetracycline (500 mg every 6 hours for 5-10 days or 21 days to avoid relapse) <u>or</u> (Sulfonamide may be used if other drugs are <u>not</u> available <u>dose: 2- 3 gm. daily for 5-7 days</u>). ✓ It is given to contacts & at-risk groups <u>e.g.</u> personnel of plague control & inhabitants of camp where cases have appeared, penicillin is not effects. <p>N.B. administration of large dose of antibiotic leading to high mortality due to liberation of the toxin from the MOs (Exotoxin, endotoxin & a substance <u>called</u> Fraction 1). <u>So, it is necessary to give the antibiotic in early stage of disease combined with Gamma globulin from hyper immune serum from rabbit.</u></p>
International measures:	<ul style="list-style-type: none"> ✓ Notification within 24 hrs. by governments to WHO & adjacent countries. ✓ Importation of rats from endemic area should be prevented by strict control measures should be applied by rat proofing measures on ships, air-craft and land transport arriving from plague area. ✓ All ships should be free of rodents <u>or</u> periodically Derattization. في العملي بالتفصيل (chemical or physical Derattization) ✓ Rat proof buildings at seaports and airports

Spirochetes diseases

1. Lyme disease	2. Leptospirosis	3. Endemic relapsing fever
Causative agent: Borrelia burgdorferi. Transmitted by: western black legged tick. Signs: General weakness + fever + stiffness of neck + joint pain + profuse sweating + lymphadenitis + varying degree of skin rashes.	Lepto = thin & Spira = spiral تحت بالتفصيل	تحت بالتفصيل

Items	Leptospirosis	Endemic Relapsing Fever
synonyms	✓ Weil's disease (in man), Canicola fever (in dogs), ✓ Rice-field fever, ✓ Swineherd's disease, Swamp fever, Mud fever, Spirochetal or Infectious or Hemorrhagic jaundice, ✓ Cane-cutters fever, Flood fever, Stuttgart disease.	✓ Tick-borne Relapsing Fever, ✓ Recurrent Typhus ✓ Borreliasis, ✓ Borreliosis, ✓ Spirochetosis & Spirochetal fever.
Def.	✓ Acute general infectious zoonotic bacterial disease, affecting man & various kinds of domestic & wild animals Caused by: <ul style="list-style-type: none"> ○ Infection with pathogenic members of genus Leptospira. ✓ <u>Weil's disease</u> discovered by <u>Adolf Weil (1886)</u> . ✓ More than 200 "serovars of Leptospira have been identified ✓ Falls into about 20 sero-groups based on <u>serologic relationship</u> , but all the pathogenic leptospirae are now classified as a single species: Leptospira interrogans . ✓ Multiplication of pathogenic leptospirae organisms is often enhanced & grows in media containing 3-10 % mammalian blood serum. Vitamin B12 & yeast extract. Characteristic features of the organism are: <ol style="list-style-type: none"> 1) Sharp hook-like extremities projecting at an angle from the main axis. 2) resemble to the letter (S) 3) Distinguished acc. to their antigenic structure. 	✓ Bacterial zoonotic disease of wild rodents readily transmissible to man through an insect vector ticks (Ornithodoros turicata). ✓ <u>Caused by:</u> at least <u>15 different Borrelia species</u> . ✓ <u>Soft ticks</u> of genus Ornithodoros spread tick-borne variety. ✓ The responsible Borrelia species are identified closely with its tick vector & they share parallel nomenclature. ✓ Spread between humans by body lice, when crushed into bite wound.

	<ul style="list-style-type: none"> ✓ <u>Leptospirosis</u> is worldwide in urban & rural areas, except for <u>Polar Regions</u>. ✓ Main reason for the importance of this group as a cause of disease in man & animals <u>is their ability to survive for long periods outside the host</u> & to penetrate the intact skin & mucous membranes. <p>So, it considered as occupational disease (hazard) for:</p> <ol style="list-style-type: none"> 1) Rice-field workers (paddy field) & sugarcane plantations. 2) Farmers, sewer workers, minor, veterinarians, agricultural workers. 3) Abattoir workers, fish workers, dairymen & military troops. 4) Swimming in open water & server-workers. 5) All persons who are liable to work in rat-contaminated Environment. 6) All are exposed to high risk where the disease is <u>endemic</u>. 	
Causative Agent	<ul style="list-style-type: none"> ✓ <u>Leptospira interrogans (G -ve spirochete)</u>. ✓ G -ve spirochetes with bent <input type="checkbox"/> or hooked ends. ✓ Organisms are difficult to be stained but <u>usually observed by Dark-field illumination condenser <input type="checkbox"/> technique</u>, which is widely used (because thickness of Leptospira is smaller than the allowing capacity of an ordinary microscope). ✓ Fontana stain is the specific stain for spirochetes. ✓ Spirochetes stained <u>brownish-black on a brownish yellow background</u>. 	<ul style="list-style-type: none"> ✓ <u>Borrelia recurrentis (Spirochetes)</u>. ✓ Transmitted by different species of ticks of genus (Ornithodorus). ✓ <u>Borrelia recurrentis</u> is also the cause of Epidemic relapsing fever transmitted <u>by human lice</u> (Pediculus humanus corporis) (man-to-man).

Reservoir Host & Source of infection	1) Urine from infected animals that contaminates water, food & moist soil. <u>Leptospira is found in parenchyma of liver & spleen & are found between & in lumen of kidney tubules where they persist & propagate for many weeks & shedding or descending in the urine.</u>	1. Borreliae survive in ticks for long time (Trans-ovarian transmission).
	<u>Shedding of Leptospira in urine in different spp of farm animals:</u>	2. Ticks are found in rodent burrows & wooden huts.
	1. Sheep & goat = 9 months.	3. Tick spp. <u>Ornithodoros turicata</u> attacks <u>sheep & goats & infests hides, rodent & snake burrows & pigsties.</u>
	4. Cattle = 30 – 100 days.	4. Infection is acquired by <u>crushing of infected lice.</u>
	2. Pig = 1 year.	5. <u>Reservoirs:</u>
	3. Dog = 2 - 6 months	<ul style="list-style-type: none"> ○ <u>Wild animals & ticks</u>, which are also vectors of infection. ○ These ticks are long living & very resistant to <u>desiccation & long periods of fasting</u> in environments of low humidity & high temp.
	6. Man = 75 – 163 days.	
	2) <u>Found in milk</u> during acute systemic phase in cattle & remain viable in milk for several days.	
	3) <u>The field rat (Arvicanthus niloticus) & their excreta</u> may contaminate <u>canals water, man is infected when come in contact with contaminated water</u> because Leptospira can penetrate through MM of eye, nasopharynx <u>or</u> through skin abrasions.	
	4) <u>Reservoirs of infection to man</u> are mainly <u>mammals</u> including <u>rats, mice, dogs, cats, rabbits, cattle, buffaloes, sheep & goats.</u> Although <u>fish, reptiles & birds</u> have been incriminated. Reservoirs with stagnant water are first of all the place of the infection dissemination, <u>such as swamps, ponds</u> , temporary reservoirs formed after floods & rice fields. Water of these reservoirs is <u>an intermediate link between animals-leptospire carriers & healthy animals & man.</u>	
	5) <u>Rodents</u> have been found to be <u>the most important reservoirs</u> , but other groups of <u>mammals</u> such as <u>carnivores, ruminants, porcine & equines</u> may play an important role as <u>animal hosts of leptospire, beside reptiles & arthropods.</u>	

Mode of transmission	<p><u>Mechanism of transmission is similar for all leptospires</u></p> <ol style="list-style-type: none"> 1. <u>Direct or indirect contact</u> with <u>urine</u> of the infected animals. 2. Domestic & wild animals-leptospires carriers excrete leptospires <u>with urine</u>, which infect natural & artificial reservoirs, soil & food. 3. <u>Man is usually infected indirectly by contact with contaminated food or water.</u> Leptospira entrance through mucosal surface either <u>abraded or intact skin</u> (conjunctival, nasal, oral & vaginal MM). 4. <u>Infection through ingestion</u> (although the acidity of the stomach is sufficient to destroy Leptospira) —penetrating power of the organism in the buccal, pharyngeal <u>or esophageal M.M.</u> 5. People also get infected when using <u>raw milk from diseased cows.</u> 6. <u>Bites of dogs, rats or ferrets</u> have been recorded to occurring preceding symptoms of leptospirosis in man within 5-10 days. 7. The causative agent of disease was isolated from mosquitoes, biting flies and lice. Therefore, <u>blood-sucking arthropods</u> may play a role in the epidemiology of the disease. 8. A few cases of <u>laboratory infections</u> by contamination of conjunctiva <u>or</u> abraded skin <u>with infective guinea-pig material</u> have been recorded. Occasional cases follow an actual rat bite. 9. <u>Swimming in water contaminated by urine of diseased animals.</u> 10. <u>Laboratory infection</u> through <u>accidental inoculation</u> with culture of leptospires is possible. Some cases of human infection were observed in people who made P.M examination of animals & who cut infected carcasses. 11. Under civilized condition of living man probably does not return infective leptospires to environment as a result of infection but <u>under primitive conditions he may serve as a source of contamination of his environment with urine- borne leptospires.</u> 	<ul style="list-style-type: none"> ✓ Principally tick bite, usually at night. ✓ All tick stages feeding on blood (larvae, nymphs & adults) <u>are infective.</u>
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**Disease in
man
&
Symptoms
(Signs)**

1. Icteric form: (weil's disease) (10 %):

I/P = 9-10 days & course of disease divided into 3 stages:

1) 1st stage or febrile stage (Leptospiaraemia):

- Typical febrile systemic condition.
- Prostration & vomiting.
- Jaundice at end of 1st week.

2) 2nd stage or Toxic stage (Development of antibodies):

- Development of antibodies.
- Jaundice becomes deeper S/C & internal hemorrhage with fever.
- Renal & hepatic failure & death.

3) 3rd stage or Convalescence stage:

- During 3rd week signs of jaundice become disappear.
- Recovery takes months.

2. An-Icteric form: (water fever) (90 %):

- Less severe & No jaundice.
- Flue like illness.
- Intense headache + severe myalgia + aseptic meningitis.

3. Complications:

- Hemolytic anemia.
- Vitreous opacity & loss of hair.
- Abortion in pregnant woman.
- Hemorrhagic eruption & Epistaxis.
- Hepato-spleno-megaly.
- Jaundice & meningitis.

✓ I/P = 6-8 days after tick bite but it may vary from 5-15 days.

- 1) Sudden onset, high fever (41°C) lasting for 3-4 days, begins & disappears suddenly.
- 2) Fever is accompanied with chills, profuse sweating, headache, myalgia, arthralgia & vomiting, then temp. drop.
- 3) Erythema, petechiae or petechial rash (Minute haemorrhagic spot of pinpoint to pinhead size in the skin),
- 4) **Epistaxis (Nosebleed) & jaundice** of varying degrees of severity
- 5) After some days without fever.
- 6) Attacks of fever recurrent several times lasting longer than in first episode.
- 7) Case fatality rate = 2- 5 %. greater risk if untreated.

Relapsing Fever is a dis. Ch. by relapsing (i.e. recurring) episodes of fever, often accompanied by other symptoms.

Prevention & control	<ol style="list-style-type: none"> 1. <u>Derattization</u> will eliminate a reservoir. 2. <u>Hygienic control of dog populations</u> & elimination of <u>stray dogs</u> 3. Prevention of contamination of public water reservoirs (<u>well water</u>) & <u>food from rodents & other potential leptospiral carriers.</u> 4. In foci of infection, the use of <u>unsterilized water for drinking & bathing should be prohibited.</u> 5. <u>Boiling or chlorinating effects water decontamination.</u> 6. Urine of infected persons should be disinfected & disposal hygienically (<u>preserved in air tight tanks for 3-4 weeks, its pH value will become highly alkaline, which destroy most MOs, then adding CaOCl₂ 3%.</u> 7. Use of <u>calcium cyanide</u> fertilizer appears likely to be the most effective measures (168 Ib./acre) for stagnant water. 8. <u>Prevention of abrasions & cuts in the skin</u>, which may serve as portals of entry of the infection. 9. <u>Vaccination: (by a vaccine contain dominant local strain).</u> 	<ol style="list-style-type: none"> 1) Avoid bite of ticks living in caves, burrows of rodents & other animals <input type="checkbox"/> primitive huts. 2) De-ticking, insecticide treatment & rodent control for endemic disease (Derattization <input type="checkbox"/> Deratting). 3) Construction of rodent & tick-proof human dwellings. 4) Use of repellents (dimethyl phthalate) in natural tick foci. 5) Delousing & improved hygiene for epidemic disease.
Treatment	✓ Penicillin G & Erythromycin (3 × 10 ⁶) I.U for 5 days.	—
Diagnosis	في العملي بالتفصيل	في العملي بالتفصيل

Mycotic borne diseases (Mycosis)

1. Molds	2. Yeast	3. Yeast Like organism.
<ol style="list-style-type: none"> 1. Cladosporium. 2. Alternaria 3. Aspergillus 4. Fusarium 5. Mucor 6. Penicillium 7. Rhizopus 	<ol style="list-style-type: none"> 1. Rhodotroubrula rubra. 2. Rhodotroubrula mucileginosa 3. Torulopsis glaberata. 	<ol style="list-style-type: none"> 1. Candida albicans. 2. Candida ascalaphidarum 3. C. amphixiae 4. C. Antarctica ...

FUNGI

- ✓ Most of fungi have natural habitats likes: Soil, water, air, decaying organic matter and inanimate objects.
- ✓ There are more than 100,000 species of fungi wide spread in nature.
- ✓ Classified into: pathogenic & saprophytic (commensals).
- ✓ pathogenic fungi may cause disease in various parts of human or animal body & there are 3 types of infections can be distinguished:
 - 1) Involves skin, hair, or nail called: superficial mycosis or Dermatomycosis or Dermatophytosis. (digest Keratin)
 - 2) Involves S/C tissue called: S/C mycosis. (e.g. sporotrichosis)
 - 3) Involves internal organs called: systemic granulomatous mycosis or deep mycosis. (e.g. asperigellosis & histoplasmosis ...)
- ✓ From ecological & epidemiological standpoints 3 groups of spp. distinguished acc. to their reservoirs & natural habitat into:
 - 1) Anthropophylic group: Primary fungi of man, which may infect animals.
 - 2) Zoophylic group: Primary fungi of animals & may infect man.
 - 3) Geophylic group: Fungi found commonly in soil of many localities and can infect both man & animals.

It may be caused by:

1) Primary pathogens:

- ✓ Such as: Histoplasma capsulatum, Coccidioides immitis & Blastomyces dermatitides.
- ✓ All these strains are considered as diphasic or dimorphic fungi.

- ✓ Dimorphism is capacity of some spp. of fungi to grow only as moulds outside the body & other only as yeast inside the body, depending on the environment,
- ✓ In vitro, mycelial form on Sabourauds dextrose agar medium (SDA) as: white fluffy colonies.
- ✓ In vivo, yeast form in tissue as: small rounded or oval yeast-like cells.
- ✓ Soil saprophytic & live in restricted ecological areas, where the soil become contaminated with the excreta of poultry, other birds or animals & then through inhalation, respiratory system become infected.

2) Opportunistic pathogens:

- ✓ Such as: *Aspergillus fumigatus*, *Candida albicans*, *Mucor* spp. & *Cryptococcus neoformans*.
- ✓ Cause diseased cases only when body resistance is lowered because almost all of them are normal inhabitants in resp. tract, digestive tract & genital system (vagina).

Items	Ring worm (Tinea)	Favus (Tinea favosa)
synonyms	<ul style="list-style-type: none"> ✓ Zoonotic Mycotic disease of worldwide distribution. ✓ Tinea means "ringworm" or "moth-like". ✓ Dermatologists use the term to refer to a variety of lesions of the skin <u>or</u> scalp. ✓ <u>Tinea scaly inactive center & active peripheral</u> because of Anthrospores present in peripheral. ✓ Common in both <u>man</u> as: Tinea & <u>animals</u> as: Ringworm (Dermatophytosis). Name derived from character of lesion, which begins small & spreads centrifugally. 	<ul style="list-style-type: none"> ✓ Communicable disease of man & animals (mammals & poultry). ✓ Usually a chronic zoonotic infection involves or affects scalp & in nails. ✓ Scalp lesion is called <u>Scutulum or (Scutula)</u> ✓ Yellow spots in peripheral of nails. ✓ Scutula is a cup shaped yellow mass of fungus & tissue debris with a characteristic <u>mousy odor</u>. ✓ The lesion gives appearance of being <u>stucked on the scalp</u>, which usually ended with <u>scarring & permanent focal alopecia</u>.
Causative Agent	<u>Ringworm caused by 4 related genera of filamentous fungi imperfecti related to septated hyphae namely:</u> <ol style="list-style-type: none"> 1) <i>Microsporum canis</i>. 2) <i>Trichophyton verrucosum</i>, <i>equinum</i> & <i>mentagrophytes</i>. 3) <i>Epidermophyton flaccosum</i> & 4) <i>Keratinomyces</i> <u>or</u> <i>kerationphyces</i>. 	<ol style="list-style-type: none"> 1. In Man → <i>Trichophyton Schoenleini</i>. 2. In Mammals → <i>Trichophyton quinckii</i> & <i>Microsporum gypseum</i>. 3. In Poultry → <i>Trichophyton gallinae</i> <u>causing</u> white comb in poultry.

Source of infection	<p>1. All contaminated materials with infected hair (hair brushes & towels & barber instrument & A' grooming equipment)</p> <p>2. Soil as in geophylic fungi. (Anthrospores in dermal scaly scalp)</p>	- Active lesion in human or animals.
Reservoir	<p>✓ Mainly active lesions in man & animals.</p> <p>✓ Tinea scaly inactive center & active peripheral because of Anthrospores present in peripheral.</p> <p>✓ From sick & carrier host.</p>	
Mode of transmission	<p>✓ Direct & indirect</p> <ul style="list-style-type: none"> ○ <u>Direct</u> with infective lesions. ○ <u>Indirect</u> by using of infected person articles. <p>✓ Inhalation of Anthrospores in air.</p> <p>✓ Rodents & mice act as reservoir host.</p>	<p>✓ Direct & indirect</p> <ul style="list-style-type: none"> ○ <u>Direct</u> with infective lesions. ○ <u>Indirect</u> by sharing infected personal articles. <p>✓ Poor hygienic conditions.</p>
Susceptibility	<p>✓ Children before age of puberty are susceptible to Microsporum infection.</p> <p>✓ All ages are susceptible to trichophyton infection.</p>	
Clinical Signs in man	<p>✓ I/P = 5 - 12 days or 1 week.</p> <p>✓ Lesion produce tends to be circular.</p> <p>A) acc. to site of skin involved:</p> <p>1. On the glabrous human skin:</p> <ul style="list-style-type: none"> ✓ Limited sized lesions usually with definite edge. ✓ Scaling or vesicular lesion may be single, multiple or coalescence which give an irregular shape. <p>2. On the scalp:</p> <ul style="list-style-type: none"> ✓ Lesions appear as patchy loss of hair & scaling to some extent depending on etiologic agents. ✓ Main symptom is itching. & bad odor in scalp. 	<p>1. Loss of hair & nails.</p> <p>2. Minute, sub-cuticular pin point yellowish red puncta which developed into yellowish cup shaped elevated crusts.</p> <p>3. Mousy odor.</p> <p>4. Hair: lusterless + lose its elasticity & ultimately sheds.</p> <p>5. Nail infection: begin from their free ends with appearance of yellow spots.</p> <p>6. Nails become lusterless, thickened & brittle.</p>

3. On the sole of foot & its inter-digital spaces:

- ✓ Skin show changes varying from scaling to extensive maceration, small vesicle may develop resulting in itching & bad odor (smell) of the foot (athlete's foot).

B) acc. to location in body:

1) Tinea corporis (on body):	2. Tinea Capitis (on scalp of head)
<ul style="list-style-type: none">✓ Annular erythematous papulo squamous lesion.✓ Scaly Inactive centrally & active periphery.✓ Stunted with Crusting vesicle & pustules.✓ More common in children.	<ul style="list-style-type: none">✓ Scaly & erythematous lesions.✓ Deep ulceration & kerion like eruptions.✓ Affected hair weakened, brittle, lusterless & lessened with offensive odor
3. Tinea pedis (on foot)	4. Tinea Unguis (on nails)
<ul style="list-style-type: none">✓ Small blisters with rupture & discharge thin fluid.✓ Peeling & cracking.✓ Itching between toes.	<ul style="list-style-type: none">✓ Opaque nails, thickened, discolored & brittle.✓ Caseous material from under the nails.
5. Tinea barbe (on beard)	6. Tinea Curis (on groin, perineum & perineal area)
<ul style="list-style-type: none">✓ Masses of small <u>boils & primples in apex.</u>✓ Inflamed & Pus filled areas on the skin	<ul style="list-style-type: none">✓ Severe itching.✓ Cutaneous pruritis.

Diagnosis

- ✓ Diagnosed by woods light or wood's lamp illumination → **green fluorescence.**

Prevention & control	<ul style="list-style-type: none"> ✓ Children in schools must be diagnosed & cured completely. ✓ Public health education about dis. Transmission. ✓ Adequate sterilization by (boiling, formalin hypochlorite) of clothes & brushed & equipment. 	<ul style="list-style-type: none"> ✓ As in case of Ringworm: ✓ If cold climates where animals are stabled over long periods of time. ✓ Dermatophytosis can be a problem in cattle & horses. ✓ In USSR (Union of Soviet Socialist Republics) there are two vaccines were developed, one for cattle made from an attenuated strain of <i>T. verrucosum</i> & another for horses made from <i>T. equinum</i>. ✓ <u>Both vaccines gave satisfactory results in prevention of Dermatophytosis.</u>
Treatment	<ul style="list-style-type: none"> ✓ Tinea cure <input type="checkbox"/> or funginil (powder). ✓ Dermatin (cream - soln - powder). ✓ Floucoral = flouconazole (single oral dose & repeated after week) ✓ Diflucan (150 mg) 1 capsule orally (Pfizer). ✓ Treflucan (150 mg) 1 capsule orally (EIPICO). + oily meal. ✓ Canesten (cream & soln.) ✓ closal (topical soln. & spray) 	<ul style="list-style-type: none"> ✓ An effective drug against Dermatophytosis & Candida is FLUCORAL. A single oral dose of <u>FLUCORAL (Fluconazole 150 mg)</u> 1 capsule (broad spectrum anti-mycotic) ✓ Dose is repeated after 1 week (SEDICO Co.). Box of 2 capsules
D.D.	<ul style="list-style-type: none"> ✓ Vitiigo → destructed melanocytes. ✓ Tinea corporis → loss of hair only. 	

Items	Candidiasis (thrush)
synonyms	<p>✓ acute or sub-acute Mycotic zoonotic infection in which fungus may produce lesions in mouth, vagina, skin, nails, bronchi or lungs & occasionally a septicemia, endocarditis or meningitis.</p> <p>✓ <u>Candidiosis</u>: term applied to a group of diseases caused by different spp. of Genus Candida of which <u>Candida albicans</u> is the most frequently encountered as causative M.O in these diseases.</p>
Causative Agent	<ol style="list-style-type: none"> 1) Candida albicans (yeast-like organism). 2) Candida tropicalis. 3) Candida krusei. 4) Candida guilliermondii. 5) Candida pseudotropicalis. 6) Candida stellatoidea. 7) Candida parapsilosis. <ul style="list-style-type: none"> • Round, oval, cylindrical or elongated cell 3-6 μ in diameter, • Reproduce by budding & develop pseudo mycelium of all or most strains of all spp. • Pseudo mycelium is often <u>differentiating into</u> pseudo hyphae & blastopores Ch. by the production of chlamydo-spores <u>on rice or corn meal agar</u>. (G +ve organism). •
Source of infection	<p><u>Pathogenic strains of C. albicans can be isolated from:</u></p> <ol style="list-style-type: none"> 1) Sputum of infected patients. 2) Milk of cattle (mastitis). 3) Exudates or excretions of infected man & animals. 4) Normal skin, oral or vaginal MM. 5) Stool of normal individuals, <u>it is obvious that most infections have endogenous source.</u>
Reservoir	<ul style="list-style-type: none"> • Avian & mammalian spp. including man.

Mode of transmission	<p>1) <i>Candida albicans</i> is a common commensal of man & animals occurring in nose, mouth, throat, intestine, vagina & skin.</p> <p>2) It occurs in mouth & in stool of 20-30% of healthy persons.</p> <p>3) Infection can be transmitted by contact with secretions of the mouth, skin, vagina & feces of sick persons <input type="checkbox"/> carriers.</p> <p>4) A mother with <u>vaginal thrush</u> can infect her baby at the time of delivery.</p> <p>5) Infants, for instances may be infected from their mothers.</p> <p>6) Artificially fed babies are more often affected than breast-fed babies.</p> <p>7) Infection is thus usually endogenous, but occasionally exogenous & contagious.</p> <p>8) <i>C. albicans</i> is found in bedding of patients & in air.</p> <p>9) It may be spread by contact <input type="checkbox"/> by air-borne infection (droplet <input type="checkbox"/> dust infections).</p>				
Clinical Signs in man	<p style="text-align: center;">4 forms</p> <table> <tr> <td> <p>1. cutaneous candidiasis</p> <ul style="list-style-type: none"> Exposure of <u>skin to trauma</u>. White exudate, erythema & <u>desquamation of epith.</u> Lesions present in <u>axilla, abdominal Folds, inter digital space & umbilicus.</u> Onychia: <ul style="list-style-type: none"> <u>Nail bed:</u> red swelling, painful. <u>Nail:</u> thick, hard, transverse debris with <u>brown color.</u> </td><td> <p>2. Oral candidiasis:</p> <ul style="list-style-type: none"> Creamy white patches of exudate <u>when removed bright red base</u> (patches may be <u>single & large or multiple & small</u>). On tongue & internal mucosa of cheek. </td></tr> <tr> <td> <p>3. Vaginal candidiasis:</p> <ul style="list-style-type: none"> Creamy white patches of exudate & inflammation of <u>MM of vagina.</u> Severe itching may reach anus. </td><td> <p>4. Pulmonary candidiasis:</p> <ul style="list-style-type: none"> 2ndry infection to lungs as: T.B. High temp. & pulse. Mucoid gelatinous sputum tinged with blood. Cough & pleural pain. </td></tr> </table>	<p>1. cutaneous candidiasis</p> <ul style="list-style-type: none"> Exposure of <u>skin to trauma</u>. White exudate, erythema & <u>desquamation of epith.</u> Lesions present in <u>axilla, abdominal Folds, inter digital space & umbilicus.</u> Onychia: <ul style="list-style-type: none"> <u>Nail bed:</u> red swelling, painful. <u>Nail:</u> thick, hard, transverse debris with <u>brown color.</u> 	<p>2. Oral candidiasis:</p> <ul style="list-style-type: none"> Creamy white patches of exudate <u>when removed bright red base</u> (patches may be <u>single & large or multiple & small</u>). On tongue & internal mucosa of cheek. 	<p>3. Vaginal candidiasis:</p> <ul style="list-style-type: none"> Creamy white patches of exudate & inflammation of <u>MM of vagina.</u> Severe itching may reach anus. 	<p>4. Pulmonary candidiasis:</p> <ul style="list-style-type: none"> 2ndry infection to lungs as: T.B. High temp. & pulse. Mucoid gelatinous sputum tinged with blood. Cough & pleural pain.
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Prevention & control	1) Prevent neonatal thrush by treatment of pregnant woman. 2) Derattization. 3) Prevent dis. Of chicken by disinfection of eggs by iodine soln. before incubation.
Predisposing factors	1) Antibiotic therapy. 2) Corticosteroids. 3) Tranquilizers. 4) Contraceptive drugs. 5) Pregnancy.
Treatment	✓ All hygienic measures. ✓ Touch by gentian violet. ✓ An effective drug against Dermatophytosis & Candida is FLUCORAL . A single oral dose of FLUCORAL (Fluconazole 150 mg) 1 capsule (broad spectrum anti-mycotic) Dose is repeated after 1 week (SEDICO Co.). Box of 2 capsules
Diagnostic tests	في العملي بالتفصيل 1) Pellicle formation test. → Candida tropicalis & Candida krusei. 2) Serum (germ) tube test. → Candida albicans & Candida stellatoidea.

Items	Actinomycosis (lumpy jaw)
synonyms	✓ Lumpy jaw.
Def.	<p>✓ Chronic bacterial disease <u>Ch. By:</u> granulomatous inflammation with suppuration & presence of multiple sinuses discharging pus containing granules (white yellow granules) called: <u>Sulpher Granules</u> <u>or</u> <u>Rosettes</u>, w' can be seen with naked eye <u>or</u> by the use of a hand lens.</p> <p>✓ These granules are characteristic of infection.</p>
Causative Agent	<p>1. <u>Actinomyces bovis</u> -> Lumpy jaw (Smooth colonies) -> isolated from animals.</p> <p>2. <u>Actinomyces wolffisraeli</u> <u>or</u> <u>Israelii</u> -> (Rough colonies) -> principal causative agent in man. It is a rough colonies.</p> <p>✓ <u>Some reports indicate isolation of A. Israelii from animals & A. bovis from man.</u></p> <p>✓ Actinomyces baudettii, Actinomyces lignieresi & other species as: A. viscosus (canine) & A. naeslundii (man) are less frequently isolated.</p> <p>• Gram-positive, branching bacilli.</p> <p><u>All strains of Actinomyces:</u></p> <ol style="list-style-type: none"> 1. Have the ability to <u>hydrolyze casein.</u> 2. Decompose <u>xanthine & tyrosine.</u> 3. Produce <u>acid of some CHO.</u> 4. Reduce <u>nitrates (NO3) to nitrites (NO2).</u> <p>✓ Actinomyces are higher bacteria with many characteristics of fungi.</p> <p>✓ It is part of <u>the normal flora of the mouth</u> of <u>animals & man.</u></p> <p>✓ Actinomyces combine some feature of both bacteria & fungi.</p> <p>✓ Some authors considered Actinomyces is more closely to true bacteria & most often are considered as higher, filamentous bacterial forms. <u>They are G +ve, non-acid-fast, ranged from an aerobic to micro-aerophilic branching bacilli.</u></p>
Reservoir Host & Source of infection	<p>1. Vegetables or any grass & hay contaminated with saliva & faeces of diseased animals.</p> <p>2. Oral cavity of man & animals contain Actinomyces as: saprophytes <u>or</u> commensal in the mouth cavity around carious teeth (<u>dental Carries</u>) & in tonsils (<u>tonsilar Crepts</u>).</p> <p>3. Actinomyces are not found living freely in the environment.</p>

Reservoir of human infection are infected animals:

- 1) **Cattle** & sheep → (Lumpy jaw).
- 2) **Horse** → (Fisteolous withers & Poll-evil).
- 3) **Swine** → (Mastitis).

- ✓ The disease is world-wide distribution.
- ✓ Infection in man is infrequent.

Mode of transmission

- 1) Endogenous infection: As the organism is present in the mouth around carious teeth, develop as: saprophytes within & around carious teeth or in the dental enamel & in the tonsillar crypts & infection may be introduced through wounds induced from the extraction of teeth, coarse foods or foreign objects, or surgical wounds.
- 2) Presence of foreign bodies in the lesions suggests that M.O is present in nature & is introduce into the mouth of those having the habit of chewing straws, grains or weeds. Actinomyces have been isolated from excised tonsils, decaved teeth, saliva & from vaginal secretions of some women using intrauterine contraceptive device (IUDs).
- 3) There is no evidence of transmission of infection from animals to man through milk or meat or by accidental inoculation, but people working with farm animals have a higher incidence of the disease.
- 4) There are records in which infection has followed human bite.

Disease in animal

1. In cattle: called Lumpy jaw in which the Actinomyces bovis invade the bone of lower jaw causing proliferative ostitis or Lumpy jaw.
2. In horse: Actinomyces bovis cause Poll evil & Fisteolous withers.
3. In swine: mastitis (in sow) & chronic funiculitis (inflammation of spermatic cord) which follow castration process (in boar).

Disease in man

- ✓ There are 3 major clinical forms:
- ✓ The disease causes a suppurative granulomatous lesion that open to the surface through fistulas.
- ✓ There are several clinical forms acc. to their location:

Forms in man	1. Cervico-facial form	2. pulmonary <u>or</u> thoracic form	3. Abdominal <u>or</u> intestinal form	4. Generalized form.	5. Superficial infection
	<ul style="list-style-type: none"> ✓ Most common form. ✓ Start with hard swelling under mucosa of mouth → then affect jaw → face & neck. ✓ Form multiple abscess w' soften & formation of sinuses & may open through skin & drain purulent discharge (characteristic sulphur granules or rossets secretion). 	<ul style="list-style-type: none"> ✓ Follows Cervico-facial ✓ Aspiration of exudates to reach bronchial tubes & lung & cause bronchopneumonia. ✓ There are multiple sinuses & fistulous in thoracic wall. 	<ul style="list-style-type: none"> ✓ Follows Cervico-facial ✓ Ingestion of exudates. ✓ Localized in region of appendix & cecum & may stimulate acute or sub-acute appendicitis. ✓ Produce hard tumor lesions adhere to abdominal wall. ✓ Infection extends to abdominal skin & sinuses are formed. 	<ul style="list-style-type: none"> ✓ In frequent & occurs due to invasion of blood vessels & lymph ducts. 	<ul style="list-style-type: none"> ✓ In female genital tract due to colonization of Actinomyces in genital tract of woman using IUDs.
Prevention & control	<ol style="list-style-type: none"> 1) Affected cattle should not be allowed to pasture with other cattle as they contaminate vegetation & grasses through contaminated saliva or faeces. 2) Thorough meat inspection & condemnation of affected parts (organs). 3) Proper <u>or</u> good oral hygiene in man, prevention of spread exudates from draining lesions & removal of predisposing factors (skin & mucosal injuries in particular). 4) Education to those having the habit of chewing straws, weeds <u>or</u> grains that they should stop it. 5) Instruction to dentists that they should sterilized their tools <u>after every tooth extraction</u>. 6) Education to those having the habits of chewing straws, grains or weeds that they should stop it. 				
Treatment	<p><u>Treatment</u> with oxytetracycline, Chloroxytetracycline, isoniazid or sulphonamide.</p> <p>Also is accomplished with actinolyates, sulphadimezin & chloromycin. These drugs are prescribed in combination with iodine, X-rays therapy & surgery. (Surgical removal all lesion).</p>				

مشاركة

محاضرة (١٠)



Items	Avian Chlamydiosis (Psittacosis)
synonyms	<ul style="list-style-type: none"> ✓ Parrot fever. ✓ Ornithosis in man.
Def.	<ul style="list-style-type: none"> ✓ It is primary dis. Of birds & occasionally infect human. ✓ Psittacosis derived from Greek word for <u>Parrots (Psittacus)</u> & dis. Manifested in Psittacine birds or parrot family & non-Psittacine birds. ✓ <u>Psittacine birds</u> = parrot & canaries birds & parakeets. طيور الزينة ✓ <u>Ornithosis</u> = non-Psittacine birds as: duck, geese & turkey.
Causative Agent	<ul style="list-style-type: none"> ✓ Various strains of chlamydia psittaci W' belong to <u>Chlamydia group</u> (now grouped into bacteria) <ul style="list-style-type: none"> ○ Because of their obligate intracellular parasitism. ○ Contain both types of nucleic acids (RNA & DNA). ○ Have bacterial-like cell wall & Sensitive to Antibiotic (many antibacterial agents can inhibit their growth). ○ Have a variety of enzymes & co-enzymes & multiply by simple binary fission & possess ribosomes. (virus not)
Reservoir Host & Source of infection	<ol style="list-style-type: none"> 1. Infected or carrier birds shedding the organism in their droppings (intermittent shedding). 2. Insects mechanically transmit it. 3. Biting of infected bird. 4. Resp. & oral secretion of infected persons. 5. Occupational dis. Affect (vets + lab workers during P.M + others workers in turkey processing plants ...) 6. Man to man transmission is rare(may transmitted during coughing or sneezing). 7. Infection rarely by direct contact through bite wounds.
Mode of transmission	<ul style="list-style-type: none"> ✓ World-wide distributed. ✓ Disease Prevails in winter months when human begins brought in close contact with birds. ✓ <u>Aerogenic route</u> through inhalation air borne agent in contaminated environment (droplets from nasal secretions or dust particles from dried faecal droppings, feathers & cadavers).

Symptoms (Signs)	Dis. In animals.	Dis. In man (Ornithosis)
	<ul style="list-style-type: none"> ✓ <u>Psittacine birds</u> = parrot & canaries birds & parakeets. ✓ <u>Ornithosis</u> = non-Psittacine birds as: duck, geese & turkey. ✓ <u>Enzootic abortion in sheep.</u> ✓ <u>Epizootic abortion, Encephalomyelitis & polyarthritis in cattle.</u> ✓ <u>Conjunctivitis in G. Pig.</u> ✓ <u>Pneumonia in cat.</u> 	<ul style="list-style-type: none"> ✓ I/P = 1 -2 weeks. (Sometimes longer). 1. Flue (Influenza) like symptoms (sudden <input type="checkbox"/> gradually appeared). 2. Chills restlessness, malaise, anorexia headache & pain in back. 3. At 1st: Non-productive cough (dry cough) sputumless pneumonia called: atypical pneumonia (patchy bronchopneumonia). 4. <u>Later expectoration of tenacious mucoid sputum that becomes muco-purulent (Moist cough).</u> 5. Temp. rises rapidly (fever) & decreased during 2nd or 3rd week. 6. Photophobia. 7. In severe cases: hepatosplenomegaly, vomiting, nausea, diarrhea & Epistaxis. ✓ Un-complicated cases: (0.7 %) complete recovery. ✓ Complicated cases: Endocarditis, myocarditis & hepatitis & anemia & neurological signs (Insomnia & mental depression).
Prevention & control	<ul style="list-style-type: none"> ✓ <u>No vaccine.</u> 1. Prevent intermingling of chlamydia carrying wild birds with domestic birds, <u>by strict regulation of imported birds based on quarantine & lab. Examination.</u> 2. Improve management. 3. Increase awareness of the dis. 4. Rapid & effective treatment with <input type="checkbox"/> without diagnosis using Penicillin <input type="checkbox"/> Aureomycin <input type="checkbox"/> tetracycline. 5. Infected bird must be killed & their bodies immersed 1st in 2% cresol <input type="checkbox"/> any disinfectant as: Q.A.Cs & lipid solvent. 6. Liver, Spleen & kidney aseptically removed & send or dispatched immediately to lab & carcass must be burnt after P.M (autopsy <u>or</u> necropsy). 	
Treatment	<ul style="list-style-type: none"> ✓ Using Penicillin <input type="checkbox"/> Aureomycin <input type="checkbox"/> tetracycline. 	

Food infection & food intoxication

- ✓ **Food infection:** caused by reaction of human ☐ A' host to development or multiplication of an infectious agent in its body or to the toxins that the agent produces once established in host's intestine or other tissue.
- ✓ **Food intoxication:** caused by ingesting toxins or toxicants with food.

Food infection

Items	Salmonellosis	Shigellosis	Colibacillosis				
synonyms	<ul style="list-style-type: none">Enteric infection.Enteric epizootic Typhoid.	<ul style="list-style-type: none">Dis. Of poverty.Bacillary dysentery.	✓ <u>Coli-bacteriosis, colitoxemia, white scours, Gut edema of swine</u>				
Def.	<ul style="list-style-type: none">Zoonotic bacterial food infection as a result of ingestion of food contained massive doses of viable cells (microbes) of genus salmonella,Destroyed in the GIT, lead to production of endotoxins responsible for salmonella food poisoning.Typhoidal salmonellosis: concerned to human only & caused by S. typhi & S. Para-typhi.Non-Typhoidal salmonellosis: more than 2500 serotypes & very important.<u>2 main groups:</u><table><tr><th>S. bongori</th><th>S. enterica</th></tr><tr><td>Affect cold blooded A'</td><td>Contain pathogenic serotypes & named Acc. To its place <div>or</div> origin.</td></tr></table>	S. bongori	S. enterica	Affect cold blooded A'	Contain pathogenic serotypes & named Acc. To its place <div>or</div> origin.	<u>Foodborne & waterborne infection.</u> <ul style="list-style-type: none">Acute infection of bowel with frequent diarrhea often streaked with blood, mucus or pus, fever, vomiting, abdominal cramps & tenasmus (ineffective efforts at defecation)Severe cases marked by dehydration & abdominal distention.Most severe in infants (25 % fatality) & children (5 % fatality).	<ul style="list-style-type: none">There are more than 150 serotypes based on somatic (O) antigensBoth enterotoxigenic (ETEC) and enteroinvasive (EIEC) strains. <div><u>Types of Escherichia Coli</u><ol style="list-style-type: none">Enteropathogenic E.coliEnteroinvasive E.coliEnteroadherent E.coliEnterotoxigenic E.coliEnterohaemorrhagic E.coliEnteroggregative E.coli</div>
S. bongori	S. enterica						
Affect cold blooded A'	Contain pathogenic serotypes & named Acc. To its place <div>or</div> origin.						

Causative Agent	<ul style="list-style-type: none"> ✓ G –ve bacillus, aerobic, rod shaped. ✓ Salmon & Smith 1st described it in 1885. ✓ 2500 serotypes. <p>Virulence factors of salmonella are:</p> <ol style="list-style-type: none"> 1. LPs. 2. Outer membrane protein. 3. Fimbriae & Flagella. 4. Toxin & Exotoxin. 5. <u>Antibiotic resistant gene.</u> 	<ol style="list-style-type: none"> 1. Shigella flexneri type (6) 2. Shigella dysenteriae 3. Shigella boydii 4. Shigella sonnei 	
Reservoir Host & Source of infection	<ul style="list-style-type: none"> ✓ Human beings & animals. ✓ Food involved: <ol style="list-style-type: none"> 1. Large variety of food as: meat. 2. Fresh meat may carry salmonella. 3. Poultry & eggs & its dressing, 4. Fish & other sea food, 5. Milk & its products. 6. Fecal contaminated vegetables. 7. Dogs & Cats & domestic mammals. 8. Arthropods are vectors & reptiles & turtle & snakes. 9. Studies suggest Trans ovarian passage of salmonella especially salmonella enteritidis. 10. Environmental sources as water, sewage & agricultural products. <p>Q: Role of animals & food of animal in the epidemiology of salmonellosis</p>	<ul style="list-style-type: none"> • Human (infected or carrier). <p><u>Food involved:</u></p> <ul style="list-style-type: none"> • Most mixed food, milk, beans, potato, tuna, shrimp, turkey & macaroni salad 	<p><u>Food involved:</u></p> <ul style="list-style-type: none"> ▪ Coffee substitutes, salmon & cheese

Mode of transmission	<ul style="list-style-type: none"> ▪ Ingestion of salmonella organism with contaminated food <u>or</u> water ▪ Usually fecal-oral cycle except, <i>S. Dublin</i> in raw milk from cow with udder infection. 	<ul style="list-style-type: none"> ▪ Via fecal oral route with some mechanical vectors as flies 	
Factors contribute to spread of infection:	<ol style="list-style-type: none"> 1. Improper cooking of food. 2. Gross contamination of food. 3. Improper storage of food. 4. Improper handling of food. 	<ol style="list-style-type: none"> 1. <u>Degree of economic development.</u> 2. <u>Contaminated objects.</u> 3. <u>Bad personnel & environmental hygiene.</u> 	
Disease in man	<p>I/P: → 12 - 36 hours. & May week & May 2 hrs. <u>Acc. to Susceptibly.</u></p> <p>Depend on:</p> <ol style="list-style-type: none"> 1. dose of ingested organism 2. Type of organism & its virulence 3. resistance of host that's affected by <ol style="list-style-type: none"> a. Natural immunity b. Age (young individuals more susceptible) c. Debilitating disease as: malnutrition. <p>✓ <u>Invasive form of salmonella cause very dangerous effects meningitis & arthritis as: <i>S. choleraesuis</i>.</u></p> <p>World widely distributed serotypes are:</p> <ul style="list-style-type: none"> ✓ <i>Salmonella typhimurium</i> ✓ <i>Salmonella enteritidis</i> 	<ul style="list-style-type: none"> ▪ <u>I/P = 1 - 4 days.</u> ▪ <u>Usually less than 4 days.</u> 	<p><u>I/P:</u></p> <ul style="list-style-type: none"> ▪ <u>8 - 18 hrs. for Enteroinvasive type</u> ▪ <u>8 - 44 hrs. for Enterotoxigenic type</u> <p><u>(1 - 9 days average 3 - 5 days)</u></p>

Symptoms (Signs)	<u>Signs:</u> <ol style="list-style-type: none"> 1. It's a recognized food poisoning & Severity varies from <u>diarrhea to acute gastroenteritis</u> 2. Gastroenteritis , sudden onset with mild fever , nausea , vomiting , severe abdominal pain ,cramp colic & foully smelling diarrhea 3. Watery greenish foul smelling stools , muscular pain , faintness , drowsiness , anorexia & dehydration 4. Morbidity is high any outbreak by toxin (endotoxin). 5. About 0.2 - 5 % become carriers 6. Symptoms persist for 2 - 3 days followed by uncomplicated recovery 7. Although in localize itself in GIT it may invade other tissues & systems as respiratory & cardiovascular 8. time period following the eating of infected food or drink depend upon certain predisposing factors <ol style="list-style-type: none"> a. They type of salmonella b. The number of the organisms swallowed c. General health condition of victim. 	<ul style="list-style-type: none"> ▪ Abdominal cramps, fever & chills. ▪ Diarrhea (watery stool, frequently containing blood, mucous or pus). ▪ Tenasmus, headache, nausea, dehydration & prostration. 	<ol style="list-style-type: none"> 1. <u>Enteroinvasive:</u> <ul style="list-style-type: none"> ✓ Fever, chills, diarrhea, myalgia & profuse watery diarrhea. 2. <u>Enterotoxigenic:</u> <ul style="list-style-type: none"> ✓ Diarrhea (rice water stool). <p><u>Dis. Caused by E.coli (O157 : H7):</u></p> <ol style="list-style-type: none"> 1. <u>Hemorrhagic colitis (HC):</u> <ol style="list-style-type: none"> 1) Severe abdominal pain 2) Watery stool 3) Frankly bloody diarrhea 2. <u>Haemolytic uremic syndrome (HUS):</u> <ol style="list-style-type: none"> 1) Acute renal failure. 2) Thrombocytopenia. 3) Microangiopathic haemolytic anemia. 4) Blood film shows fragmented RBCs
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Prevention & control	A. Preventive measures <ol style="list-style-type: none"> The use of sanitary conditions in animal stable Avoiding contact with fecal matter Systemic elimination of chronic carriers is important Strict hygiene measures in slaughter house and butchers shop The best storage temperature is below 10c as the multiplication of the salmonella is stopped. 	<ol style="list-style-type: none"> Personal hygiene Chill food rapidly in small quantities Sanitary preparation of food Thorough cooking of food Protect & treat water Hygienic disposal of sewage Fly control & good sanitation practices 	<ol style="list-style-type: none"> Chill food rapidly in small quantities Cook food thoroughly. Practice personal hygiene. Prepare food in sanitary manner. Protect and treat water. Sewage disposal in sanitary manner.
	B. Control of infected individual, contacts & environment <ol style="list-style-type: none"> Obligatory reporting of infection to local authorities Exclusion of infected persons from food handling occupation Specific treatment of infected persons as the contaminated food is not eliminated naturally saline purge is indicated 		
Treatment	<ul style="list-style-type: none"> Antinal (broad spectrum intestinal antiseptic & antidiarrheal) Suspension & capsules Used in acute and chronic bacterial diarrhea and gastroenteritis 	<ul style="list-style-type: none"> ✓ <u>Supportive treatment with fluid therapy.</u> ✓ <u>Avoid antibiotics</u> ✓ <u>Streptoquin</u> (1 - 2 tablets 3 times daily). ✓ <u>Imodium capsules</u> for acute & chronic diarrhea ✓ <u>Visceralgine</u> for pain treatment of GIT 	
Diagnosis	في العملي بالتفصيل	في العملي بالتفصيل	

Items	Botulism	Staphylococcal intoxication	Diphtheria
synonyms	<ul style="list-style-type: none"> • Allantiasis. • Foodborne & waterborne intoxication 	<ul style="list-style-type: none"> • Zooanthroponotic dis. • Food & water borne intoxication. 	✓
Def.	<ul style="list-style-type: none"> • A rare but serious paralytic illness <u>caused by</u> a nerve toxin that is produced by the bacterium clostridium botulinum. • Prevent release of Acetyl choline cause resp. paralysis & death. 	<ul style="list-style-type: none"> • Zoonotic dis. Affect all animals except birds caused by staphylococcus aureus. • Cause many diseases in man & animals. 	
Causative Agent	<ul style="list-style-type: none"> ✓ Toxin produced by clostridium botulinum . ✓ There are 7 types of botulism toxin designated by the letters through G ✓ (A,B,C,D,E,F and G) only types of A,B,E & F cause illness in man 	<ul style="list-style-type: none"> ✓ G +ve Staph. Aureus produce enterotoxin (A, B, C1, C2, and D). ✓ A = most potent. ✓ Named for its golden yellow pigment. 	<ul style="list-style-type: none"> ✓ Corynebacterium diphtheriae. ✓ C. Gravis ✓ C. intermeduis ✓ C. mitis <div>C. Gravis = more serious one.</div>
Reservoir Host & Source of infection	<ul style="list-style-type: none"> • Main source for man & animals is food in which clostridium botulinum has multiplied & produced the toxin. <p>There are 3 main kinds of botulism:</p> <ol style="list-style-type: none"> 1. <u>Foodborne botulism</u> is caused by eating food that contain the botulinum toxin 2. <u>Wound botulism</u> is caused by toxin production from a wound infected with clostridium botulinum 3. <u>Infant botulism</u> all forms of botulinum can be fatal. 	<ul style="list-style-type: none"> • Human. • Commensal M.O. <ol style="list-style-type: none"> 1. Contaminated food & milk. 2. Coughing & sneezing. 3. Cow with mastitis. 4. Improper refrigerated milk or by products. 	<ul style="list-style-type: none"> • Human. <ul style="list-style-type: none"> ✓ Discharge from nose, pharynx & tonsils of infected person.

Mode of transmission	<ul style="list-style-type: none"> ▪ Ingestion of canned food. ▪ A' & man food. 	<ol style="list-style-type: none"> 4. Ingestion of contaminated food & milk. 5. Inhalation of droplet from infected person. 6. Through skin & M.M. 	<ol style="list-style-type: none"> 1. Ingestion of contaminated milk with discharge or from mastitic milk. 2. Direct contact with infected person. 3. Domestic fowls.
Disease in man & Symptoms (Signs)	<p>I/P:</p> <ul style="list-style-type: none"> ▪ 18 - 36 hours but may be short as 2 - 4 hrs. or as long as 4 days depending on the toxin ingested <u>& need Anaerobic condition & PH = \uparrow 4.5</u> ▪ If incubation period is short, prognosis is very bad. <ul style="list-style-type: none"> ✓ Classic symptoms are <u>double vision, blurred vision, dropping of eyelids, slurred speech, difficulty in swallowing, dry mouth & muscle weakness</u> ✓ Disease is a <u>febrile</u>. ✓ GIT symptoms are nausea, vomiting, abdominal pain & sometimes constipation ✓ Followed by <u>CNS manifestation presented by ptosis & diplopia</u>. ✓ Consciousness & sensitivity <u>persist until death</u> ✓ Immediate cause of death is <u>respiratory failure</u>. ✓ Mortality rate is <u>high</u>. ✓ Until recently botulism wasn't considered a cause of death in infant as they don't ingest the kind of food that can contain botulinum toxin. 	<p>I/P:</p> <ul style="list-style-type: none"> ✓ <u>2 - 4 hrs. May 30 minutes.</u> <ol style="list-style-type: none"> 1. Local infection: <ol style="list-style-type: none"> 1) Furuncles or boils: small suppurative inflammation in S/C tissue & hair. 2) Carbuncle: circumscribed cavity contains pus. 3) Abscess formation. 2. Systemic infection: <ul style="list-style-type: none"> ✓ Circulate in blood cause septicemia, abscess & Osteomyelitis. 3. Pneumonia. 4. Enterocolitis. 5. Food poisoning (salivation, nausea, vomition & diarrhea). 	<ol style="list-style-type: none"> 1. Localized form: <ul style="list-style-type: none"> ✓ Fibrinous greyish pseudo membrane over tonsils, larynx, pharynx dirty gray to brown with bad odor. 2. Respiratory form: <ul style="list-style-type: none"> ✓ Pseudo-membrane on trachea & bronchi complete obstruction of air passage. ✓ M.O produce powerful potent diffusible exotoxin invade heart muscles & local tissues in throat (<u>toxic myocarditis</u>) 3. Systemic form: <ul style="list-style-type: none"> ✓ Absorption of toxin w' attack heart, kidney & L.N. 4. Cutaneous form: <ul style="list-style-type: none"> ✓ (wound diphtheria) ✓ Ulcer is shallow, round & bluish covered by adherent membrane.

Notes	<p>Infantile botulism</p> <ul style="list-style-type: none"> It was proved that clostridium botulinum colonizes the infantile intestine where it produces potent toxin Age 3 - 26 weeks infants appear lethargic, feed poorly, are constipated (the first sign usually) Followed within hours to 2 weeks by neurologic symptoms of the head and the neck and have a weak cry and poor sucks and muscle tone The infant has dysphagia, paralysis that may proceed and cause respiratory failure and finally death <p>Complication of the botulism</p> <ul style="list-style-type: none"> Death due to respiratory failure Patients who survive an episode of botulism poisoning may have fatigue and shortness of breath for years and long term therapy may be needed to aid recovery 	Grow very fast in protein <input type="checkbox"/> or starch.	
Prevention & control	<ol style="list-style-type: none"> Regulation & inspection of industrial process for bottling, canning & preserving food. Health education. Home canned food should be boiled before being served. Foods from swollen cans not be eaten. Prevent botulism in A' as not offer altered fodder & food. Correct diet of A' in presence of pica. <u>Vaccination with polyvalent toxoid in areas where botulism is a problem.</u> 	<ol style="list-style-type: none"> Personnel hygiene. Refrigeration of food to prevent bacterial growth. Vet. Supervision in dairies. Routine disinfection of hospitals. Disinfection of children institutions & industrial plants. Bacteriological examination of carriers. Ttt. Of wounds of infected person. Ttt. Of vitamins deficiency. 	<ol style="list-style-type: none"> Isolation of patient. No contact with diseased person. Disinfection. Efficient pasteurization of milk. Education measures. Active immunization vaccination at 6 months & booster at 2 years & again after school entry (DPT Vaccine).

Treatment	<ul style="list-style-type: none"> ✓ Respiratory failure & paralysis that occur with severe cases may require the patient to be on a breathing machine (ventilators) for weeks plus intensive medical & nursing care ✓ After several weeks , the paralysis slowly improves if diagnosed early ✓ Foodborne & wound botulism can be treated with an antitoxin which block the action of toxin circulating in the blood, this can prevent patient from worsening but recovery still takes many weeks ✓ Physicians may try to remove contaminated food still in the gut by inducing emesis <u>or</u> by rectal enemas , wounds should be treated usually surgical to remove the source of the toxin producing bacteria ✓ Good supportive care in the hospital is the mainstay of the therapy for all forms of botulism ✓ <u>Currently antitoxin is not routinely given for treatment of infant botulism</u> 	Antibiotic & sulphonamide.	<ul style="list-style-type: none"> ✓ Large dose of antitoxin (I.V) as soon as possible). ✓ Penicillin antibiotic is excellent adjuvant. ✓ Active immunization vaccination at 6 months & booster at 2 years & again after school entry (DPT Vaccine).
Diagnosis	في العملی	في العملی	في العملی